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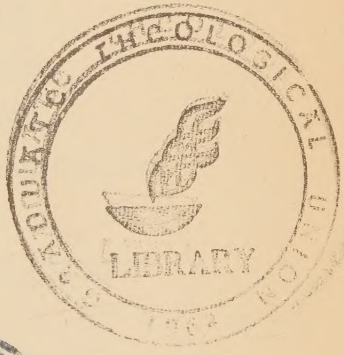

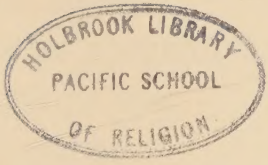

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CONTENTS

Chapter		Page
	FOREWORD	ix
I	THE MONADS OR REAL ATOMS THEIR NATURE AND ACTIVITY. HOW THEY COMPOSE THE WORLD.	1
II	THE PLURALITY OF THE MONADS	19
III	THE RELATEDNESS OF THE MONADS	35
IV	MONADIC INTERCOURSE	39
V	SPACE AND TIME	44
VI	THE SOCIETY OF THE MONADS	49
VII	INDIVIDUALITY AND EXPRESSION	53
VIII	THE MECHANISM OF LANGUAGE	62
IX	IDEAL ACTIVITY AND MATERIALIZATION	65
X	THE PHYSICAL UNIVERSE	69
XI	THE INTELLECTUAL MODE OF ACTIVITY	76
XII	SENTIENCE AND TRUTH	86
XIII	THE PRINCIPLE OF CONTINUITY	89
XIV	THE KNOWLEDGE OF GOD	92
XV	THE IDEAL OF TRUTH AND THE LIMITATIONS OF KNOWING	99
	POSTSCRIPTUM	108

FOREWORD

Cogito ergo sum

In this book I have sought to express in logical sequence my own theory of knowledge and existence. My previous writings have been for the most part expository and critical attempts to indicate the significance of the newer theories in biology and physics and to appreciate some of the newer forms of idealism. This book I have written primarily for myself alone, that is, I have sought to give consistency to my thinking and unity to my thought. In form I have followed the *Monadology* of Leibniz : the matter is my own.

My philosophy is a Monadism. In order to put my readers at once at my point of view I will state my theory briefly and refer to the main criticism which it has to encounter.

I think the world consists of active, living, individual subjects of experience. I call them monads. They alone are real. Material objects in space and time are not monads nor composed of monads ; they are appearances or phenomena and exist only in the perceptions of the monads. The monads themselves are active and individual. They are distinguished from one another by their internal nature which they express in their activity. They have no external form, but each has an individual outlook.

I know my existence in the self-consciousness of my own active thinking. I cannot define this existence for I have no descriptive terms which do not acquire their meaning from reference to the directly

experienced fact itself. This existence known in knowing is immediate, and this immediate knowledge must be possessed by every self-conscious monad.

Knowing is ideal and knowledge in every form—perception, thought, memory, imagination—is the activity of a subject, and insofar as it is a definite product of that activity it belongs inalienably to the subject.

On this basis I have attempted to formulate a coherent metaphysics of reality.

The criticism which such a philosophy has to meet is that it is solipsistic, and solipsism has always been thought to be self-stultifying. It is generally allowed that if solipsism be affirmed there is no logical argument by which it can be refuted, but the nature of the limitation is such that it must always fail to carry conviction.

I do not deny that the monadic theory is solipsistic. On the contrary the solipsistic character of knowledge is to me self-evident fact. But solipsism, rightly interpreted, gives strength to the intellectual structure erected upon it. I can only feel my own sensations, imagine my own fancies, think my own thoughts—is this to debar me from interpreting my own life, and from expressing that interpretation in terms of general usage and universal application? Should I be better equipped for the philosophic task if I could effectively alienate myself, living others' lives and thinking others' thoughts?

We are, it seems to me, subject to an illusion which appears to be part of our human nature itself, for it is impossible to dispel it in practical life however successfully philosophy may expose it in theory. The illusion is that we are disinterested observers

who contemplate the physical universe from a privileged point of vantage outside it. The world we survey seems alien to us and we seem independent of it. Because it is the sphere of our activity and sets limits to the range of our effective actions we are to that extent dependent on it, yet in itself it is indifferent to us. It is an illusion, for we can no more view the universe from without than we can step outside ourselves. Our position is within and our outlook is internal. What we behold in the world is only our own activity reflected to us in the imagery which gives that activity expression.

It will be seen that my way of regarding the problem of knowledge and existence is different *toto genere* from that of contemporary realism. The activity of the mind according to the realist consists in acts of awareness which lead to the discovery of an objective reality and an objective order effectively independent of the mind. My reasons for rejecting this view are given in my other writings, in particular in *A Theory of Monads*, and they are not repeated here. I have confined myself to the attempt to shew that a metaphysic of existence is consistent with the principle of the ideality of knowledge. While my theory of knowledge is idealistic and even solipsistic, my theory of existence is vitalistic. Only living things are. Thus I hold that we can affirm a real universe independent of the activity of the mind in perceiving it, although we can only know this real universe mediately in our ideal representation. We can do this because, and only so long as, we identify existence with life.

It may serve to clarify my theory if I say that by reality I mean existence and by ideality I mean representation. I have no use for the distinction

which many philosophers make between subsistence and existence. For me the world of becoming is the world of being.

The zoologists tell us that there are creatures in the depths of the ocean who contrive to peer into the darkness by the light which is generated by their own activity. May not this be also our case? A creative evolution has formed our intellect as an instrument of the specific mode of our vital activity. Philosophy began with the turning of the mind inward on itself, for thus did Socrates interpret the Delphic inscription γνῶθι σεαυτόν. If modern science has widened the outlook and deepened the interest in the physical universe, philosophy still turns the eyes inward in its continual endeavour to understand the mystery of existence.

COGITANS COGITATA

I

THE MONADS OR REAL ATOMS

THEIR NATURE AND ACTIVITY
HOW THEY COMPOSE THE WORLD

1. The monad is the individual subject of experience; in the fullness of its activity, in its undifferentiated unity, in its inclusion of its predicates, in its comprehension of space and time.

The monadic theory is a rationalization of the atomic theory. Like the atomic theory it is based on the reasoning that the world is composite and that its components must be simple. The atoms of the old philosophy are only simple in name, it is impossible to justify the definition of their simplicity in fact. The monads are simple in fact and not merely by definition, for they are subjective in their activity and individual in their actions. A subject is simple however various its activities, and an individual is indivisible however complex its actions. We talk of a stream of consciousness and of divided personality, but the subject of consciousness is not disparate and a divided personality is the discovery of two individuals beneath the semblance of one and the same person.

To common sense reflexion objects group themselves into two distinct classes, the inert and the living. It seems that in the natural order the inert must be prior to the living, for we only know life as conditioned and the conditions must be prior to the conditioned, and so the natural conclusion of common sense is that the material world is original and the living world derived. The monadic theory reverses this common sense conclusion, and finds that the living world is original and the material world derived. Materiality is not the inner nature of the physical world but only its outward aspect, a mass effect produced by the subjective activity of all reflected in the individual activity of each.

The atom of the old philosophy was conceived as a substantial unit constituent of extended matter with a minimal space occupancy. But minimal space occupancy is inconsistent with the infinite divisibility which geometry predicates of space. The monad is a real unity. It is active and its activity is internal development not external determination. It is not, like the atom, a movable thing in an external space.

Activity differs from movement as force differs from inertia. Movement is determined in direction and velocity by space and time factors. Activity is the outward expression of an internal nature, it generates its own spatiality and temporality.

Wherever there is life activity is individualized. The individual is a real unit, however extensive, from its own standpoint, may be the range and duration of its activity, and however

wide, from an external standpoint, may be the influence it exercises. We may say therefore that in the living world there are real units, existences which are simple and not composite ; in the material world there are no units, for all existences are conditioned by space and time, and space and time are the principle of divisibility and externality.

2. The monad is not externally determined. The monads are qualitatively different ; they have nothing in common, neither extension nor duration. Every monad has its view-point from which it centralizes infinite space and actualizes infinite time.

The nature of a living creature's activity is inviolable, the range of its activity depends on conditions which the creature does not create for itself and which it may be unable in any way to control. Thus the Inquisition could order Galileo to recant, could imprison him and threaten him with death, but it could not change the nature of Galileo from which all his actions flow. So we may train a plant to follow a direction it would not otherwise follow but we cannot make the inner activity of the individual plant develop a new nature. We may train a horse to all kinds of human service, but we do so by understanding the nature of the horse, and directing its own activities, and not, as when we make a machine, by fitting together interlocking parts.

Infinite space and infinite time are not external realities which the monad apprehends as determining its position and succession relatively to other monads, they are realities it comprehends. For every monad is the centre through which infinite lines radiate. These radii can only issue from one centre and the circle through which they radiate is infinite. Every monad owns this centre of this infinite circle.

It is a commonplace reflexion that whenever we contemplate the visible universe we find ourselves lost in the infinite. We can assign no limit to the extensity of the world which surrounds us by any power of imagination or conceptual thought. We suppose this due to defect. We think it is because of our insignificance. What is our brief life compared to eternity ? What is our corner of the universe in comparison with the universe itself ? In this we are deceived. Infinity is not outside us, encompassing us, but within us ; not in any absurd meaning, not in some metaphorical or poetical sense, but in a literal meaning which can be demonstrated precisely and definitely. In the words of Pascal: *L'univers est une sphère dont le centre est partout, la circonférence nulle part.* This is not hyperbole. It is a mathematically precise definition. Consider it in regard to space as immensity and in regard to time as eternity. Suppose two subjects of experience in a definite spatial relation to one another such that A is to the right of B with a distance separating them. Is the extensity of the universe thereby different for A and B so that in at least one direction it is

shorter for the one and longer for the other? Clearly such an idea involves us in absurdity. Is it different in regard to time? Suppose A to be ten years older than B, is therefore time past ten years shorter, time future ten years longer, for the one than for the other? Again we see that the idea involves absurdity. Each of us at every and at any present point-instant centralizes and actualizes a sphere with infinite radii. These infinites do not intersect or limit one another in any manner whatever, because they are within us and not without us and not independent of us.

3. Monads are metaphysical reals, in the meaning that they are the noumenal realities from which the phenomenal ideality of the physical world is derived. The unity of the monad is not the unity of a mathematical point and the plurality of the monads is not the plurality of physical atoms. The monad is not a datum of sense and it is not a relatum of understanding. Also it is not, like the atom of physics, an intellectual construction by mathematical processes of deduction. It is the concept of reality as pure activity, and of ideality as the form and embodiment of that activity in its self-expression as the individual mind.

The monads are what Kant described as unknowable things in themselves. The predicate of unknowability was challenged by

the successors of Kant. It appeared to them to involve a self-contradiction. We cannot affirm existence of the unknowable inasmuch as the predication of existence is itself the affirmation of knowledge. But if this is an antinomy it is easily resolved. The solution is that knowledge in its nature is ideal and existence is real. The self-contradiction therefore is seen to resolve itself into the mutual exclusiveness of the real and the ideal. To know the real is to idealize it, to change its reality into ideality. Were the ideal to become real it would cease to be knowledge in order to become actuality.

We may easily convince ourselves that whether the monadic theory be true or not, the monad itself is a fact. In speaking of monads we are not referring to images or to ideas, to mental constructs or to universals, but to actual individual existences. Monads are not inferred. The self is a monad and other selves are monads. Whenever I recognize a subject of individual experience, which remains itself through all the changes it undergoes, I affirm the monadic fact.

4. I know and I act. The monadic nature of my being is the primary fact of my experience. To live is to know and to act. Knowing brings the world within me as idea ; acting inserts me in the world as real.

The modern era in the history of philosophy was initiated with the formulation of the method of doubt. The "I think therefore I am,"

the one proposition which could withstand doubt, was not a new discovery of Descartes. St. Augustine had called attention to the affirmation which underlies even the concept of universal deception in his *Si fallor sum*. The problem, however, to which Descartes devoted himself was the construction of a metaphysical system on the foundation of an existence which even doubt itself confirms. Cartesianism in its first form presents the appearance of artificiality inasmuch as it bases all scientific truth on the principle that God cannot deceive. This artificial basis of natural knowledge disappears, however, in the philosophy of Spinoza and is replaced with the doctrine of the one substance. On its affirmative side Spinoza's philosophy is unassailable, it is on its negative side that it suffers from defect. It has no place for the free individual. It can only interpret the experience of freewill as illusion. Neither God nor man is free in the meaning which we give to freedom when we use the words design, purpose, creation, invention. Those who follow Spinoza in modern thought are unable to rationalize the principle of individuality.

A new departure was taken when Kant raised the question of the possibility of metaphysics. The outcome of Kant's critical philosophy was an antithesis, amounting to an actual antinomy, between knowing and acting, between the theoretical and the practical reason. A metaphysic was impossible insofar as it implied knowledge of things in themselves, for such knowledge was proved to be unattainable,

and yet these things in themselves as Ideas of Reason were shewn to be practical postulates.

Hegel sought the reconciliation of the Kantian dilemma in the application of the dialectical method, and in the concept of the concrete universal. The fatal defect in the Hegelian system is precisely that which shews itself in Spinoza, the failure to rationalize the principle of individuality. This appears most conspicuously in Hegel's attitude towards physical science in his Nature-philosophy. Reality is thought thinking itself. Yet all thinking is individual thinking. What then is the individual? Is he something in himself or merely an adjective of the concrete universal? If individuality is adjectival the scientific method of experiment is irrational, for experiment will only yield scientific truth if things are revealing their own nature in their activity. If there be no necessary connexion between what a thing is and what a thing does, if there be no sufficient reason for contingent facts, then experiment is inherently irrational and science can only be a system of practical postulates. That science is a system of practical postulates is the theory of pragmatism.

What has been neglected in philosophy until the contemporary period is the principle of continuity which is implied in living activity. All living activity is individual and all individual activity is self-centred, outwardly directed, and inwardly reflected.

5. Philosophy is thinking the real, identifying the actuality of the world with its ideality.

The first attitude of the mind towards reality in its activity of knowing is what is termed common sense. This is the unreflective view of the ordinary subject of experience. The objects of knowledge are considered to be independently and in their own right what they are known as. The first idea of knowledge represents perception as a diaphanous, colourless relation between the mind and the objects to which it attends or which compel its attention. The difference between imperfect and perfect knowledge, complete and incomplete knowledge, is thought of as a difference in the degree or extent of discernment. To some philosophers it seems of the very first importance that such a view should be rationalized, and most realistic theories, old and new, are directed towards that end.

The common sense view is a complete misapprehension of the nature of knowledge, for it supposes knowledge of the real to be itself real, whereas knowledge is through and through and always ideal. The ideal of knowledge is truth and common sense therefore regards truth as the complete identity of the real and the ideal. "Now we see through a glass darkly; but then face to face: now I know in part; but then shall I know even as I am known." This ideal of complete identity, albeit not expected to be realized in this world, is a complete misconception. Truth were it identical with

reality would not be truth. Even in the limiting case of the self, the ego of the cogito, the subject knowing itself, the subject itself is real, its knowledge of itself is ideal.

The whole epistemological difficulty, the problem of truth, really hinges on this misconception of the fact that knowledge though of the real is itself ideal. It seems as though knowledge to be true (and only if knowledge is true is it knowledge) must faithfully copy the reality it represents after the analogy of a photograph. Truth is then defined as a perfect correspondence between idea and existence. This however is at once seen to involve a dilemma: knowledge is either true or false ; if false it is self contradictory ; if true it is useless. Stated differently, either our idea is known to correspond with reality and then if we know this we have no use for the idea, or it does not correspond with the reality and then knowledge is found to be blocking the pathway to reality.

This dilemma has led idealism to reject the correspondence theory and formulate in place of it the theory of coherence. In this theory the criterion of knowledge is self-consistency. To the extent that it implies an activity of the mind in knowing and the exercise of that activity in coordinating the world for action, coherence offers a more satisfactory theory than correspondence. It has however no advantage over it as a criterion, for it fails to explain falsehood and error, for these can be as self-consistent and as coherent as truth. It is criticism of the correspondence and coherence theories which

has led to the theory of pragmatism according to which truth is a practical postulate. The idea of truth arises in experience, according to the pragmatist theory, as a truth-claim which verifies itself by its working success. This in effect is to deny what is usually set before the mind as the ideal of truth and to replace it with a working hypothesis. Truth according to pragmatism does not exist awaiting discovery but is ever being created.

The pragmatist doctrine thus reverses the problem of truth and changes it into a problem of error. Pragmatism is in effect a theory of error, for error is the only thing which it recognizes as positive and which it claims to be able to interpret in a satisfactory logical doctrine.

The whole problem of truth and error is transformed when we recognize that ideality and not existence is the essence of knowledge. Knowledge has to be judged by its own ideal and not by comparison with something not ideal but real which stands over against it and is independent of it. Error is a defect or shortcoming within knowledge itself, it is not the antithesis of knowledge. Knowing falsely is still knowing. We smile at Don Quixote attacking the windmills under the delusion that they are giants and attributing the disastrous consequences to the malice of enchanters. Will a theory of error explain this ? Is there a discrepancy between the real windmills and the imaginary giants which can be set right by a kind of comparison we can institute and to which we can direct the mind ? Clearly not. Perception is entirely internal to

the mind and ideal in its essence. The world of Don Quixote's perception is Quixotic. If we make a comparison it can only be between his personality and other personalities framed on the same type or attached to the same frame of reference. It is plainly absurd to say that one man perceives the real and another the unreal. And what is true of perceiving is equally true of thinking. The odd opinions of Tristram Shandy's father are not errors in the meaning that they are at variance with reality. No one surely would think of testing them by the correspondence, the coherence, or the pragmatic criterion. Why not? Because Mr. Shandy's knowledge is the ideal essence of Mr. Shandy.

6. The world which I perceive presents itself to me as an aggregate of independent distinct objects extending indefinitely in all directions from a centre of perceiving activity.

In perception the world is presented objectively but known subjectively. The subject to which the world is presented in perception is not the organism or even the brain, that part of the organism which seems peculiarly concerned with the mechanism of knowing. The organism and all its parts are themselves presented objectively and known subjectively. The subject is the monad and the perception is the expression of its activity.

7. My own body is one of the objects in this world and like every other object it is external to me who perceive it and to the other objects which I perceive.

Perception cannot be explained by the physiology of the organism. We are able more or less adequately to follow the mechanism of the sensori-motor system. Nothing we know or seem likely to know about nerve structure and function offers any clue to the nature of the generation of images or the origin of the representative world. The psychical function is *sui generis*.

8. My body as an object among other objects has a special privilege in its relation to me. It mediates between me and the other objects in such a way that all my perceptions of it and of other objects are modes or modifications of it. All perceptions of all objects vary with every change of my body, and my body is the only avenue of communication between me and the world, and the only means by which my perceiving activity is effective and my perceptions are formed.

The mind-body relation interposes an acutely difficult problem at the very start of every metaphysical meditation. We should like to be able to begin by accepting with common sense

the individual living and thinking object, as we know it in the full experience of everyday life, and proceed to analyze it into its qualities and special characteristic properties, and then go on to compare it with the other objects of the world with which it interacts. Unfortunately we are held up at the outset by the simple fact that the individual organism which we call our self, when we make it an object of knowledge, is just as external to our mind in knowing it as any other object of knowledge. We know this objective self in precisely the same way as that in which we know the most indifferent thing. I cannot write without a pen and when I write it is I who write and not the pen, yet in a universe which contained no pens there would be no writing. The writing is internal to me, the pen external to me, yet without the external instrument to give expression the internal activity could find no expression. The same puzzle attaches to the mind-body problem. My activity is purely internal, my body purely external, and the internality or mind is not the simple converse of the externality or body, as a surface may be at one and the same time convex and concave, according to the relation in which we stand to it. The mind and the body are in the same way completely dissociated, and yet the one is inconceivable without the other. A universe in which there were minds and no bodies would be a universe of activities with no outlet in expression ; and a universe in which there were only externally related objects, bodies without minds, would be a universe in which there was nothing requiring

expression. Neither of the alternatives is really conceivable.

But why is it necessary to dissociate mind and body ? Why may not mind be a quality of body ? The answer is a direct appeal to fact. There is no part of the physical organism or body, such as the brain, or even a cell of the brain, which can consistently be imagined to occupy the privileged position which would constitute it mind. There is no part of the organism which is internal to the other parts and to which the other parts are external. Not only no part of the organism but even the organism in its integrality cannot claim such a privilege. The body and every part of it is perceived by the mind just as any indifferent object is perceived.

What then is the mind ? The first idea which occurs to the reflecting subject, introspecting and contemplating its own activity, is the animistic idea of an indwelling spirit. Plato in a beautiful simile represented the relation as that of the charioteer to the chariot. This is only to invite a recurrence of the original difficulty in a new form, for how are we to express the notion of an indwelling spirit except by imagining it as an object to itself, and when we do so we must suppose a knowing subject for which it is an object, and so without end.

The mind-body problem in its common sense form is already solved in the monadic theory of the nature of the individual. The opposition of mind and body is not for monadism a true opposition in the logical meaning that there is a class distinction between minds and bodies

based on their contradictory attributes. The opposition is between the real and the ideal, between existing and knowing, between being and perceiving. In its existence the monad is mind, and mind exists actually as force or latent activity ; in its expression it is body, and body is perceptual, that is, ideal. The monad as mind is internal to itself, that is, self-centred ; it is impenetrable from without ; it is self-subsistent in its substantiality. The monad expresses its own nature in its perceptions and it is ideally related to the other monads insofar as they are the objective counterpart of its perceptions.

The monadic theory is therefore initially a metaphysical solution of the mind-body problem. It declares all real existence to be mind and all ideal existence to be perception. The mind therefore belongs to the real world of existence, the body to the ideal world of perception.

9. I and my perceptions are one and inseparable. Abstracted from my perceptions I do not exist and abstracted from me my perceptions do not exist.

My perceptions have the universe as their object and abstracted from my perceptions the universe has no content, it is without essence. The universe which exists in independence of my perceptions is the universe of the monads which do not depend on my perceptions.

By the universe I may mean the monads and then I affirm an existence which I cannot

perceive ; or, I may mean the object of my perceptions, then the universe is within me ideally as the reflexion in the mirror.

There is a difficulty which meets us at the threshold of all theories of perception. It is that we are compelled to endow the object of perception with an existence which is independent of our perceiving. We perceive the external world in time and space, and part of our perception is that our own apparition in that world is spatially and temporally defined. When we present inaccessible portions of space and irrecoverable periods of time to our mind in idea, we may be quite ready to admit that the essence of our perception is drawn from actual experience, that when we imagine non-present reality we are also imagining our presence as perceivers, yet notwithstanding this admission and the obvious implications of the esse-percipi doctrine, we have still the difficulty that we must affirm an existence effectively independent of the aspect it assumes to our consciousness. The world we perceive is the world into which we were born at a definite instant and from which we expect to depart at a definite instant.

All idealist philosophers have recognized this difficulty. There are two positive ways of meeting it. One is the answer of Berkeley. It is that the world we perceive has existed, exists now and will continue to exist in the mind of God, the universal spirit percipient. To this the sceptic may reply that we can deny the existence of God. Yes, Berkeley admits, but

in denying the existence of God you are denying the existence of the unperceived objective world. The two denials are interconnected. Materialism, he insists, is absurd, because there cannot be perception without a perceiver, and if there be no universal perceiver there is no universe perceived. This was Berkeley's reason for thinking his philosophy interposed an absolute non-posse to the atheist.

The other answer is that of Leibniz. It is that the mind affirms itself in a way which is not invalidated by the destruction of the body. While the body is essential for the expression of the mind's activity it does not affect the existence of the mind as possibility. Mortality characterizes the body but not the mind, or soul, or entelechy, or monad. Leibniz's definition of a mind is the counterpart of John Stuart Mill's definition of a thing, for Mill a thing is the permanent possibility of perception, for Leibniz mind is the permanent possibility of perceiving. The work of God in creation was not, according to Leibniz, the fashioning of material into which living souls could be introduced, it was the bringing into existence of the monads, real possibilities of perceiving and real possibilities of perception. The history of the world is the actualization of its possibility.

II

THE PLURALITY OF THE MONADS

10. I and my perceptions are one, yet there is diversity within the unity. I distinguish my perceptions from one another and I distinguish my perceptions as a whole from my activity in perceiving. I exercise a certain control over my own activity, but my perceptions are not determined in their form by my activity in perceiving. While I control my activity and determine its direction I do not determine the form of my perceptions when I perceive.

The problem of the one and the many—How are the many one?—meets us in mathematics in its abstract form. Every number is unity in multiplicity, for every number, over and above the fact that it represents or stands for the aggregate or composite of the units which enter into its constitution in their mere multiplicity, is also the presentation of these units as one whole. It is logically impossible to identify the number with the sum of its parts or to identify the component units with the number. Owing to the perfect abstractness of mathematics the qualitative distinction between a number and its unit constituents seems to be reduced to the bare fact that we distinguish the sum of units with a particular name.

In the living organism, and more especially in the mind-body relation of the self-conscious individual, the problem meets us in its concrete form. The mind is one and indivisible and at the same time it depends wholly on the individual activities which compose the organic body. There is no mind apart from body, no body apart from mind, yet mind and body while completely identical are absolutely distinct. In the mind-body relation the principle of individuality takes the form of identity in difference, unity in diversity. The manifold, diverse, multiform activities of the organism are the activities of the one indivisible living body, and the individual living body is the end or goal of all activity. Yet each component living cell is individual, with its individual origin, its individual ancestry, its individual career and its individual goal. Throughout the organic living world the individual is both one-many and many-one.

What is of peculiar significance in the mind-body relation is that the individuality of the mind is never an interference with the individuality of the constituent cells of the body. The many-ness of the body does not merge into the one-ness of the mind. The mind without the body is not nothing—it is force without efficiency, activity without expression, possibility without actualization, thought without reality. The body without the mind is organization without control, means without direction, instrument without user. The problem is that this one-many relation holds of the unit constituents of the organism as it does of the whole organism.

11. I perceive my body as an external object and I perceive objects external to my body. The form of my perceptions of objects external to my body is in part determined by my body as the receptacle of perceptions. My body is also the avenue of my activity and the means by which it is efficient. But my perceptions of all objects, including my body, are also dependent on and determined by an activity opposed to, though not necessarily conflicting with, my activity in perceiving.

It has always seemed that the idealist theory confronts us with a dilemma in regard to the objectivity of the physical world. One horn of the dilemma is that if *esse* is not *percipi* objectivity must be an unverifiable assumption ; the other horn is that if *esse* is *percipi* there is no escape from the solipsistic position and this must reduce objectivity to pure subjectivity. The monadic theory avoids this dilemma not by rejecting the idealist formula, nor by justifying the assumption of realism as a valid inference, but by showing how the distinction of real and ideal, in the expression of the monadic activity itself, posits the reality of opposing, and therefore independent, activity.

12. The limitation of my activity which my perceptions impose on me presents a further distinction. There are perceptions which limit

my activity by their persistence and there are perceptions which limit my activity by change. The persistence of the one group and the change of the other group are alike beyond my control.

The perception of the external world may be said to be the classical problem of philosophy throughout the modern period. Perception is internal. Our perceptions are within us and not in the things we perceive, and the perceptions of things are not identical with the things perceived. Hence there arise two questions : first, How can perceptions be knowledge of external reality ? and second, How can external things cause perceptions? The difficulty of these two problems is nowhere better illustrated than in Condillac's *Traité des Sensations*. All our knowledge he considered to be built up out of the ideas generated by the sensations of the different senses and he analyzed successively the particular apport of each of the special senses. None of the senses, he came to the conclusion, could possibly give rise to the idea of external reality except the sense of touch, and that sense only when combined with active movements.

According to the monadic theory external reality is not known directly by perception. There is no perception of external things or of other minds in the meaning of a direct intuition or of simple revelation. We know them only by the limitations of our own perceiving activity and these limitations are perceived from within and take their form from the nature of the

monad and from its activity in expressing that nature. The limitations which the monad meets are of two kinds, passive and active, obstructions and oppositions. It is in the necessary interpretation of these limitations that the ideas of independent external reality are formed.

13. The persisting perceptions lead me to infer the limitation of my activity by an inert force, a passive resistance. The changing perceptions lead me to infer a limitation by active opposing forces.

Perception from this standpoint is physical rather than psychical. It is, that is to say, the form which to each monad its relation to the other monads assumes. Each monad is a force and the universe appears as a composition of forces. The force of the monad is manifested in its continual effort to express itself ; its efforts are limited, deflected, or even turned back on itself by the efforts of all the other monads which constitute the universe ; perception is the pictorial form which these conflicting efforts in a universe of forces presents to each self-conscious monad. If we think of perception as the picture or image or representation of which the monad is conscious, then perception is purely subjective. If we consider its origin in the efforts of the monads, then it represents the physical relations of the universe, that is, it becomes objective instead of subjective.

14. All my perceptions group themselves into orderly arrangements and assume the form of definite objects and regular sequences or events. The group of persisting perceptions presents an order of coexistence and the objects of those perceptions are spatial ; the changing perceptions present an order of succession and their objects are temporal events. These two orders give me the concepts of space and time, which then assume an independence of my perceptions and suggest an absolute framework in which they are set.

The concepts of space and time, the concepts of homogeneous and homoloidal abstract containers of objects and events, originate in individual experience and derive their universality from the nature of experience. They are generated out of the two orders to which the perceptions of a monad necessarily submit, an order of coexistence and an order of succession. It is because these two orders impose themselves naturally on our theoretical activity in perceiving that the coordination of experience for practice is rendered possible. The importance of this individual genesis of space and time, that is, its genesis in individual experience, is that it completely rationalizes the principle of relativity. It explains the emphasis which that principle lays on the observer and the conditions of observation, namely, that the observer be attached to a frame of reference and that that frame of reference shall

have zero velocity in relation to the movements of all phenomena observed.

Some philosophers have maintained that the implication of subjective conditions in the use of the term observer is not a real implication of the principle of relativity, that what is meant is that coordination for different systems of reference can only be effected if some recording apparatus is placed in the system, and this is most easily described by the device of imagining an observer. This is to misunderstand the whole principle. An observer is one that observes ; a recording instrument can only register a record. If recording is enough then the word observer is unjustifiable and misleading. It is clear however that what the principle considers is the experience of the observer and not the record of an objective instrument, for the condition of coordination is that the system of reference must itself have no movement, thus the earth, for example, which is moving, must be experienced at rest.

15. Objects and events fall into two divisions. Some appear to have the same kind of privilege as my body and to be the seat of perceiving subjects; others appear to be neutral or indifferent and to limit the activity of other centres of perception by opposing to them the same inert resistance which they present to me. The universe mirrored in perception consists of the living and the inert.

The distinction of the inert and the living seems to be original in perception itself and not deduced or inferred from what is perceived, or due to reflexion on experience. There is no conscious experience in which it is absent. It is the distinction between responsive and unresponsive behaviour in the object of perception. It may take the form of sympathy and antipathy but it has the immediacy of instinct and not the recognition which depends on reasoning.

16. Besides perceptions there are actions. Perceptions are inwardly directed and centripetal. So far as they represent the universe they reflect it as in a mirror. Actions are outwardly directed and centrifugal. They are framed in view of resistance and opposition, but the opposing activities are only known by the form which the resistance gives to the action.

Perception in itself is usually regarded as a purely theoretic activity, a consciousness or awareness of alien existence, serving no necessary purpose in the economy of the percipient. It is conceivable that a knower should possess a simple power of disinterested knowledge, that knowledge should be contemplated reality, and indeed in theology the divine attribute of omniscience is so conceived. In the organic world, however, perception evidently depends on actions and subserves them. Everywhere in the realm of life perception is relative to the vital

interest of the species, and to the mode and range of its activity, and it accompanies the performance of actions.

We cannot dissociate action and perception. Dissociated from perception action ceases to be action and becomes mechanically determined movement. We are able to represent perceptions without any correspondent actions. It seems to be peculiarly characteristic of the intellectual mode of activity that a perception should be not only distinct but separable from an action. It is impossible, however, to impart any meaning into perception except by regarding it as a virtual action or rather as an incipient action. What we perceive in things are certain selected influences and perception is a possible action we can effect in regard to them. It is therefore our own activity, our forming actions, ideally projected before us and pictorially reflected back to us which we call perceptions. Intelligence endows us with a power of inhibition. We can arrest our actions, deliberate with our ideal representations and decide whether we will or not perform the deed. Hence we come to divorce perceptions from actions and conceive them as different in kind, independent and existing each on their own account.

17. Perceptions and actions indicate that other perceiving and acting subjects than myself exist, but perceptions and actions are not the apprehension of these subjects. Knowledge and action are

alike ideal. The body is a sensori-motor system, and neither perception nor action are avenues by which reality passes in or out. Perception presents opposing activity objectively.

> Perception is usually regarded as the peculiar work of the brain. It is supposed that in some way, somewhere, probably in the frontal convolutions of the cerebral cortex, is the special organ whose function is to give the impressions received from the outer world the form of images representing pictorially the external objects from which they originate. If there be any such structure with any such function the *modus operandi* is not merely mysterious it is unimaginable and unintelligible. Only when perception is seen to be the essential accompaniment of action is its true nature apprehended. Thus even such an action as the removal of an irritant from the body by the leg of the decapitated frog has perception as an essential factor. There is of course in such perception neither consciousness nor recognizable subject of experience, but it would be impossible even to describe the action without introducing the idea of perception. Perception must be considered therefore as an intimate and necessary feature of living activity itself. Any mechanism, then, by which the actions of a living being are formed and carried out, must provide for perception, and if we suppose a special organization of structure for the manufacture of perceptions it is impossible to consider it as working in detachment. What marks out the perception as something

distinct from the action is its luminosity. It enables us to interpret our actions and presents their forms as objective features of the external world.

18. The view-point of a monad is from within. There is no way by which a monad could come out of itself to view the universe from an independent standpoint. The existence of other monads and the relatedness of monads in the universe is not surveyed from without but known from within.

The world is always in and with us. As we move about in space and advance in time we seem to be traversing a relative range within an absolute sphere. This is illusion. The infinite world is always centred in us. At whatever point we find ourselves this point is the centre of a sphere whence infinite radii extend. As we pass from youth to age we seem to be drawing on an absolute time store. This is illusion. Time duration is not exhausting eternity. Only relatively to human life does the past lengthen, the future shorten. At every instant the infinite past lies behind us, the infinite future before us. There is no beginning or end.

19. My perceptions and actions relate me to other monads not by interaction or interchange but by expressing the mutual influence of my

being on them, and their being on me. I am myself within the world of my perceptions and actions, and in that world I am one of many.

My individuality is unassailable and yet an essential part of my individuality consists in social relations. My individual nature is to be a member of the human family, to have fellowship with other individuals of the family. How, then, do I know my fellows? How do I distinguish them and recognize myself as one of many? What is the nature of the intuition of kinship? Were perception, as so many hold, a purely external relation between a mind and its objects, then knowledge of the human world would be on exactly the same plane as knowledge of the physical world. We should know other persons precisely as we know material objects. But to suppose that by contemplating indifferent reality, discriminating classes of objects, reasoning from similarities and dissimilarities, I could come at last to distinguish the class of objects to which I myself belong, is to suppose the impossible. It is only when we see in perception the activity of the individual expressing its own nature and forming the actions which express that nature that we are able to understand the immediate recognition of other minds. It is not because these minds are presented to my mind as objects but because fellowship is part of my own nature that perception gives me immediate intuition of this natural relationship. This does not mean that the intuition of other persons has the same immediacy as the intuition of my own existence

in the consciousness of my activity in knowing : it does mean that the relationship to others is an essential and indistinguishable part of the self which I know in knowing.

20. Self-knowledge is knowledge of others for I can only know myself as one of a society. A society is not an external relation of independent units, it is an internal relation of constituent units. Society is inherent in the individual constituents of society. The monad does not pass out of itself or forego its privilege in order to enter into society.

21. My ideal activity in perceiving and willing postulates the existence of other reals, and the essence of my perceptions and actions is relatedness.

In the first place, in my full individuality or personality as a mind-body organic unity, I am one term in a relation whose other term is a distinct individuality, for I am a human being and human beings are of different sexes. Out of the sex relation the relations to other individuals implied in childhood and parenthood arise. The sex relation is internal not external and it does not negate the principle of individuality.

In the second place, as an individual I register in my form and in the range of my activity the

inheritance of an accumulated past, and this inheritance is possessed and handed on without infringing in any way the reality and independence of my individuality.

Thirdly, if I try to conceive my individuality in abstraction from my relatedness to others there is no support for the concept. If I abstract from the relations there is no remainder.

22. The monads are reals and their relatedness is ideal. The universe of the monads is not formed by aggregation or addition but by the ideal influence of all on each and of each on all.

The monads are solipsistic individuals and yet there is by their composition a continuous universe physically and historically real : is not this a contradiction ? The contradiction is overcome when once we grasp the true nature of perception. The monad's perception is not its awareness of an external reality. Perception does not endow the monad with the power to issue out of itself, nor does it enable outside influences to enter within. The monad perceives the world in which it is acting, and of which it is its nature to form a part, and to this extent its perception is illumination, but the light is generated within by its own activity. A monad's perceptions have no kind of existence of their own independently of the monad's activity.

What then do we mean by saying that the monad perceives the universe, and in what way is the universe mirrored in the monad's perception? The spatio-temporal universe is representative, the real universe of the monads consists entirely of active forces. The existence of a force is the existence of a potentiality or possibility. The actuality of a force is its expression and the expression is conditioned. I am using the term force in a derived meaning and not in any technical meaning it may have in mathematical physics. The force of a monad is its nature, and in calling this nature a force we mean only that it may be latent, may exist purely as possibility, just as the nature of the man is potential in the newborn infant and will only be actualized or express itself in due course and under favourable conditions. The activity of the monad in the expression of its nature is its striving or effort. In the universe, accordingly, the efforts of each will be necessarily conditioned by the efforts of all and every effort will be propagated throughout the whole.

This supplies the ground of perception, it does not explain what it is or what it does. Perception is ideal, pictorial and representative, and it has an objective reference. It is clear from the outset that perception is not an apprehension of the universe as it is in itself, at most it is its appearance and its appearance under narrow limitations. Were it direct apprehension of the real it would need no interpretation and the conceptual work of science would be superfluous. As it is, nothing can be more disparate than

reality as we perceive it and reality as we conceive it. A causal theory of perception based on the principle of a direct interaction of mind and matter is quite unintelligible. On such a theory it is impossible to account for the æsthetic character of mental apprehension.

In the monadic theory perception is an activity of the monad. On its objective side it fashions the world of the monad's action, it marks out the range of the monad's activity. The particular mode of its working and the definite form its actions assume follow directly from the individual nature of the monad, and are in fact an intimate part of it. Not only is it impossible to separate the monad from its perceptions but there is no identity of the perceptions of different monads. It is a commonplace reflexion that the æsthetic presentations of different species of living animals must be as generically different as the species themselves and in each case dependent on the special organization for action of the species. What is true of the species must be true of the individuals of the species, and if there be, as we think there is, an identity of kind in the æsthetic presentations of individuals of the same species, this simply means that we recognize an identity in the subjective nature of the monads and in the form of their organization for specific action.

III

THE RELATEDNESS OF THE MONADS

23. Monads exercise an influence on one another in two ways: (1) indirectly when individual activities are overruled, coordinated and integrated in an organism or community; (2) directly in intercourse.

24. The indirect influence is illustrated in the union of mind and body. The body is composite or compound, an aggregate of active individual cells, whose activities are controlled, directed and overruled by a dominant principle or entelechy, itself individual, which without internal interference in the activities of the parts, coordinates them, making them serve a purpose which transcends their individual ends.

The mind-body in its individual unity is a monad and equally each constituent cell of the body in its individuality is a monad. Entelechy is not a different or independent entity. It is the name for the monad when its role as a dominant principle is indicated.

> Entelechy is the term which gives concrete expression to the principle of individuality. It is the concept of the whole when there is individ-

ual action of the whole quite distinct from the individual actions of the parts by means of which it is actualized. The idea of entelechy is peculiarly difficult because it is impossible to present it without at least the appearance of self-contradiction and paradox. It seems to imply the absurdity that the whole can be more and other than the sum of its parts. Yet it does no more than give expression to an obvious and recognized fact, the fact that the individuality of a composite organism is unitary and not itself composite.

Entelechy is most simply illustrated in a lowly organism. If we consider a sponge we find that it consists of undifferentiated individual cells, each dependent on its individual activity, each concerned for its own well-being, each contributing an almost exactly similar product to the common stock. Yet the sponge is not the sum total of these collective activities but an integral unit-individuality, neither identical with them nor supplementary or additional to them. It is this individual activity of the whole organism, dominating, directing and controlling the individual activities of the constituent parts, which we name entelechy.

The concept of entelechy has been consistently misunderstood and almost universally misinterpreted in biology. It is difficult to make intelligible to the scientific researcher an organizing principle existing in the organism, unless it can be shewn to depend on a separate and separable constituent element of the structure, and unless it can, at least theoretically, be isolated and studied apart. Entelechy does not exist in

isolation. Almost all critics of vitalism have treated the doctrine of entelechy as though it affirmed the presence in the organism of a factor of the nature of vitamines or hormones and they have then demanded that it shall be produced or at least that the distinctive element in which the factor resides shall be indicated. In such a criticism, and in making such a demand for entelechy, the principle itself is fundamentally misconceived.

In the classical fable of Menenius Agrippa we are told that the members of the body rebelled against the belly, complaining that it alone received and appropriated the labour of the other members. The negative moral of the fable illustrates exactly the principle of entelechy. In the body there is no constituent member which can be brought to book for injustice in the body politic, for every member performs its individual task independently, and the well-being of the whole does not depend on the mutual good-will of the members, it is brought about by the individuality of the whole. This is the principle of entelechy. To isolate entelechy would be like isolating the whole from the parts. Entelechy affirms that the organism acts individually as a whole in a way which is quite distinctive. Whether the fable applies to the circumstances of politics, and whether entelechy is a principle of the state, may be open to question, but the fable fits exactly the biological principle.

25. This principle rules throughout the living world. The individuals of the living world are entelechies and the component units of all living organic systems are themselves entelechies. The principle of life is not a composition of mechanical forces, but the harmonious disposition of self-ruling activities. It implies external purposive direction without internal interference, the union of the whole with perfect autonomy in the parts.

26. The direct influence of monad on monad is illustrated in human intercourse. Intercourse is an ideal relation in which significant self-expression in one person evokes significant self-expression in another.

IV

MONADIC INTERCOURSE

27. Personal intercourse is conditioned by a common frame of reference. Just as two people can converse together with ease, if both be seated in a compartment of a moving train, or if both be at rest on the station platform, whereas conversation is impossible if one be in the moving train and one on the platform, so monadic intercourse implies that there is a common system to which the monads are attached.

The type of living action is the overruling of individual activities to attain ends which transcend individual ends and to which individual ends are subservient. In this type of action there is no common frame of reference by which the individuals subserving the overruling purpose could understand the purpose they were subserving. In social action, on the other hand, while there is the same overruling of individual activities to attain ends which are not individual ends but which individual ends subserve, there is a common frame of reference making mutual understanding of the transcendent end possible. Wherever there is to be common understanding and ideal interchange there must be a common frame of reference.

Thus when yeast is employed to leaven bread there is purposive overruling of individual activities but there is no common frame of reference, by which the yeast cell could say to the user, " wherefore dost thou use me thus ? " When on the other hand, a general orders a battalion to attack, there is the same purposive overruling of individual activities to achieve common action; in this case, however, the frame of reference makes possible direct communication and mutual understanding of purpose. It is only between monads which have risen to the stage of rational self-consciousness that there is intersubjective intercourse.

28. The scheme of rational monadic inter-subjective intercourse is illustrated in the human mode of intercommunication by speech. Human beings are by their natural organization and neuro-muscular system fitted to discriminate sounds and reproduce them by vocal articulation. Man is thereby enabled to find self-expression in speech and in doing so he can make speech significant. In ordinary normal human experience the thoughts of the mind express themselves in speech whether the speech be internally imagined or externally uttered. The spoken words of one man heard by another may evoke in that other inward articulation

and its accompanying thought, and thus the significance of one man's self-expression may be communicated to another. The scheme involves neither interchange nor interaction in the mechanistic meaning; there is only self-expression and a common frame of reference.

> All theories of the origin of language, almost without exception, have assumed that human speech is an invention, and philologists have devoted themselves to suggesting ways in which the idea of language may have occured and the circumstances contributing to its successful establishment. The usual explanation of language is that, in some way, natural sounds to which the human ear is sensitive, and which the human voice can imitate, came to be employed as signs and acquired thereby a conventional meaning. The assumption is an irrational one. In the first place it is impossible to conceive any natural way in which speech could have been invented, and as matter of fact there is no case of its invention in the animal world, including the human, and no known way by which any creature without the potentiality of speech can be made to acquire it. Many species of animal have the power of imitation and the means of articulation, and many communicate by means of uttered cries, yet in no case have these acquirements led to speech. Speech is a characteristic human endowment, an essential part of human nature, the functional exercise of specialized structures. We may discover the mechanism

by which it is conducted, we can never discover the impulse to it or the instinct for it in anything external to the human organism itself. A speechless human being whose speechlessness is not the result of defect or inhibition or abnormality is a contradiction, it supposes a human being lacking an essential human character.

This fact that speech is innate, not acquired, is disguised from us by many things which combine to conceal from us the true nature of language. There is the fact that different races speak different languages and with great difficulty learn to speak in a language not their native tongue. We can only converse in a language which is common to us and to those conversing with us, and our minds must be attuned and in unison. What most of all serves to disguise the real nature of language is the fact that we use words in the same way in which we handle tools as external means to enlarge the range of our actions.

The proof of the view that speech is natural and not acquired by reflexion or inference or invention, is that man is essentially a thinking animal and in man thinking is inseparable from its expression in speech. The speech may be internal and unuttered but it is none the less speech. Speaking is dependent on the organism in a twofold way, it supposes two sets of active organs working in harmony, an organ for articulate utterance and an organ for reception of sound stimuli. Uttering is performed by the mechanisms of articulation, hearing by the

mechanisms of audition. The integrating of these two activities is the condition of speech. The mechanism therefore of discourse and of intercourse is apparent. A thinking animal expresses its thought in articulate sounds under its own control and when it gives utterance to these sounds can itself be receptive to the sounds it utters. Intercourse is but one further step. The articulate sounds which the thinker utters and hears may be heard by his fellows and where the minds are attuned the speech of one will be heard by another and bring from him responsive utterance. Intercourse therefore implies mutual understanding, but mutual understanding is not a mechanical effect of intercourse.

There is in fact in discursive speech absolutely nothing mechanical. One man can speak to another only because he can, and only insofar as he can, speak to himself. The external expression he can give to his own thought serves to convey that thought to another mind but only by the active responsive thinking which finds its expression in that other mind.

V

SPACE AND TIME

29. The common frame of reference, the system to which we refer in discourse is not a pre-existing condition of intercourse but a consequence of it. Intercourse between monads itself automatically creates a common world of discourse, and this common world then appears as the condition by means of which intercourse is effected.

30. When human beings converse the common system to which they refer is an absolute space-time system, that is a space which assigns to every object an absolute position and a time which assigns to every event an absolute date.

31. Absolute space and absolute time are not perceptions. The term absolute implies that they are not perceived. They are the concept of external order as a continuous series of discrete points and instants, no one of which possesses any privilege over another.

32. For the monad space is the order of coexistences in its perceptions, time the order of successions. The monad's perceptions are perspectives, it mirrors the universe from an individual, inalienable viewpoint.

That space and time are forms of an order appertaining to the perception of the world, and not an absolute background against which the phenomena of nature are observed, is the essential ground of the principle of relativity. It is the view which Leibniz continually opposed to Newton's assumption of their independent reality.

Space and time are concepts, ideas of a homogeneous extension and a homogeneous duration which do not themselves impinge on experience by sensible impressions or otherwise affirm their physical existence, but which are the necessary condition of the real existence of the physical world. The ordinary meaning of physical reality is spatio-temporal existence. Every physical thing, every matter of fact, is contingent. Its non-existence is as conceivable as its existence. In conceiving the non-existence of an existent object or fact we are simply imagining the space it occupies unoccupied. Were space and time physical realities they would be contingent, and then we should be able to imagine their non-existence. This is unimaginable for they are the necessary ground of the contingency of the physical world.

The necessity of space and time does not imply their absoluteness as existent conditions. The monadic principle secures us against such a view on the ideal side and the principle of relativity negates it on the physical side. The monadic principle shews us that we coordinate the phenomena we observe from an individual centre of activity. The principle of relativity

shews us that there is no way of conceiving space by itself or time by itself. We do indeed come to conceive a space which is a simultaneous or timeless existence and a time which is an independent variable, but we can only form the notion of space itself by reference to the interval of time required to traverse it, and we can only form the notion of time by reference to the distance traversed in an interval.

It is true that our concept of the physical world requires us to think a constant and unvarying order. Space and time therefore cannot be capricious. In effect the whole idea of the physical world would be inconsistent and science itself chimerical if it depended on a variable framework. There is no question as to our idea of the space-time which conditions the physical world, the only question is how we acquire it. The principle of relativity and the monadic theory say, not by passive sense perception, but by an active extrapolation.

33. Absolute movement and absolute change are not possible perceptions. Movement and change are only perceived in their relation to, and correlative with, a system of reference to which the observer is attached and which for the observer is at rest.

34. The rational monad or self-conscious mind coordinates a space-time frame of reference for the universe in the manner of a geometer who

traces a circle with a pair of compasses. Just as the spatial qualities of the figure which the geometer traces remain constant for him during and after construction whatever be the variations in space-time due to the movements of the system to which he is attached (for the terrestrial geometer this is the rotation and translation of the earth) so the monadic space-time frame is self-centred and unvarying.

35. The spatialization of the universe externalizes it. In externalizing its perceptions the subject presents the universe to itself as the stage for the performance of actions. In spatializing the universe external reality is presented in the definitive form of things and its processes in the definitive form of events. In expressing its activity the monad with its perceptions has become the subject of activity confronted with an objective universe; a spiritual activity in a material world.

According to common sense and scientific realism the externality of the material world is an induction from experience. According to the monadic principle it is a deduction from activity. Nature is a deductive system. The proof of this comes from science and not from speculative philosophy. Matter, when science seeks to

comprehend it in its ultimate simplicity, eludes its grasp, dissolves and disappears. The electron with its unit electric charge is not self-subsistent, for its charge is negative. Remove the electron far enough from its correlative proton and its materiality vanishes in radiation. Science is only stable when it deals with mass effects, statistical facts, law, order.

VI

THE SOCIETY OF THE MONADS

36. The scheme of monadic activity as it presents itself in the life history of the human individual, is a definite progression from pure inwardness and potentiality to actualization in outward expression, and to full realization in discursive reason, and to practical participation in the common life.

37. The monad which manifests itself in the activity of the human individual is an entelechy, or soul, or mind, in union with a body through and by means of which it perceives and acts. This mind-body organism is at first the unity of an undifferentiated internal potentiality or force awaiting the conditions of outward expression. Insofar as we represent its latent force, we conceive its activity as confused perception without discrimination of any kind or in any degree. In the full development of its activity, we represent it as not merely itself an entelechy controlling the actions of its body but as itself controlled by the society of which it is a member, performing infinitely varied functions in higher organizations of communal activity.

38. Human Society, in the ordinary acceptation of the term, is the association of individuals for a common end. It is not, like the mind-body association, governed by the principle of entelechy, for there is no dominant individual with ends of its own to which the associated individuals are subservient. On the other hand, the concept of human nature, as the present outcome of a continuous living evolution transcending generations of individuals, indicates the working of the entelechy principle on a higher plane, for in evolution individual ends are subservient to a general life purpose.

> May it be that the personality of the rational and moral individual is itself subservient to a higher entelechy? The temptation to speculate along this line is very attractive and is probably the incentive to mysticism. Yet if there be any such dominating entelechy effectively working in our human lives it would seem to be as completely concealed from us as the higher purpose of the organism is concealed from the cells which are effecting that purpose.
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> Many philosophers have thought there may be such an overruling of individual activity in the social and political institutions which give expression to a General Will. The state is sometimes represented as a higher individuality, or as individuality on a higher level than that of the component citizens. Against this idea is the impossibility of discovering in the associations of

individuals for social, political, economical and religious purposes, ends or an end which is not fully manifested in the individuals associated. Moreover the General Will, as expressed in these associations, appears always less and not more informed than the wills of the associates. While it is conceivable and may even be probable that some overruling entelechy is directing and guiding the human society for ends which are not individual ends, it is impossible to discern such activity in human institutions. These are all within the range of activity of the human individuals themselves.

What we do find, however, is that there is a point at which the development of our human nature takes an entirely new direction, a point at which man becomes more than an animal which has reached a high stage of organized efficiency, more than an intelligent individual, the stage of personality. It is as though our natural evolution had come to an end with the emergence of the human form and its organization for specific human activity, and that we had entered on a cultural evolution. With the attainment of personality man enters into a spiritual realm. The values at first are simply economic, but they rise to æsthetic, intellectual and moral values. Before the advent of scientific biology and the idea of the evolution of species, the older philosophers described this change as a rise from nature to grace, and contrasted the merely animal existence with rationality and personal responsibility. From a merely terrestrial outlook there opened out to them the prospect of citizen-

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ship in a City of God. The contrast is no less striking in our modern scientific thought. Among all the forms which life has produced in the long course of biological evolution, one only, the human, has, so far as the scientific evidence goes, attained a status from which a new and higher cultural evolution can start. Every living form up to the human, even including the man-like apes, are adaptations to the environment and dependent on the particular environment to which they are adapted. Man alone has found the means to adapt the environment to his own needs, to be independent and free, to create a specifically human world of human values. These values are social, they follow from human nature and do not require or even suggest that human nature is transcended.

VII

INDIVIDUALITY AND EXPRESSION

39. The human individual is, by its mind-body organization, sensitive to influences from without which it fashions into objects with sensible qualities by its internally directed activity. The universe is mirrored in its perceptions, but its perceptions are the aspect of the universe from within and subject to the perspective of a privileged standpoint. The forms of its perceptions are determined by the selective function which the sense organs exercise on the stimuli affecting them, and also by the free creative activity of the mind in its self-expression.

It is curious, to say the least, that every individual living being entering on the stage of free development of its activity should repeat a specific and definite chain of actions, determined for it apparently in a past which has receded into the dim obscurity of geological epochs or cosmic æons. Similarities in structural form and vital function lead us irresistibly to the conclusion of common origin, yet we find everywhere in the living world these similarities persisting, even when the evidence makes it certain that the common ancestry is infinitely remote, and that each line has continued its development independently and without contact of any kind. This is so

abundantly illustrated in the biological sciences and so fundamentally established in their principles that it is enough to mention the fact.

It leads, however, to a profound metaphysical reflexion. The continuity of living process and persistence of type, despite the widest separation in time and place and the complete breach of actual contact, imply the continuous activity of a latent power, something which philosophers have tried to substantiate under the terms *élan vital*, life force, libido, something which in a way maintains its unity and individuality throughout the multiplicity and diversity and dispersion of the generations of individuals which embody it. Thus it is that every individual with its free activity, its future absolutely open before it and undetermined, its perfect novelty, yet carries with it the strong directing determination, the predisposition and bias which it derives from its source. We are continually under the illusion that the young are pliant, that the present generation holds within it the power to determine the direction and bias of the new generation, and we are constantly being reminded by forcible experience that if human nature is making itself it is not by direct action of the living generations themselves.

It is this important fact, that a life-force is not merely giving the individual living being the power to exercise activity but definitely determining and controlling and directing the activity it exercises, which gives special significance to the spiritual process or mental development of the individual.

It is difficult to imagine that the awakening consciousness of the new born individual can be other than an original confusion into which gradually by experience an order and system is introduced. Surely, we think, an infant receiving the first shock of the stimuli from the external world on its sensitized organism cannot at once and naturally interpret its sense experience in the way it will later do. Many efforts have been made to reconstitute the infant's experience out of its supposed original sense-data. All break down before the too evident fact that every normal human individual develops a characteristic human mentality, a specifically human interpretation. Neither analytical psychology nor physical science can offer any explanation of the fact that the human mind finds itself confronted with a world of objects all of which consist of sense imagery, and that of this sense imagery the particular images are an æsthetic creation. We live in a world of our own imagination, a world we have ourselves created, a creation determined not by revelation from without but by a formative power within us.

40. Conscious experience in the form of perception and action does not begin in the human individual before the moment of birth and separation from the parental stem, but neither this moment nor any assignable moment marks the origin of the individual. At birth the individual brings to actualization an expressive

and creative activity which develops as the enjoyment and exercise of an inheritance. The scheme of this experience is not a chronological progression like the stages of infancy, youth, maturity, old age, but the progression of a spiritual unfolding with stages marked by the nature of the activity.

41. The spiritual development of the individual is twofold,—sense and understanding. An æsthetic and a logical activity give objective form to perception, and meaning and direction to action.

There is no way of conceiving how external impressions on the sense organs could themselves produce perceptions, and there is no principle by which the manifold of sense stimuli could of themselves combine to compose distinct and continuous and persisting sense objects. In whatever way the individual is dependent on stimulation from without its activity in knowing and in doing originates within : and whatever form its expression assumes what it expresses is its own intuition.

The development of the individual is spiritual in the meaning that it is fundamentally and essentially active not passive. The individual is not formed and defined and characterized by external relations or by mechanical actions and

reactions. This is evident the moment we consider the scientific account of physical reality and the psychological account of mind. Physical science gives us a world of atomic systems which ultimately resolve themselves into a geometry of space and an energetical pulsation or radio activity. The world of physics is not a world of sights and sounds and shapes and forms, it tells us nothing of colours and tones and outlines, of landscapes and symphonies, it gives us a world of abstract quantitative entities which in themselves possess no conceivable potentiality out of which the sense world could be generated. If physical science is helpless to produce the world of sentient experience, psychology is in no better case. All that psychology can offer is an analysis of experience into sense-data and laws of association, as remote from the reality of living experience as the quanta of radiation, and possessing no power of generating the experience of which they are the supposed results of analysis. There is absolutely no way by which a mind, however sensitive and receptive we suppose it to be, could conceivably constitute the world of its perception out of such constituents as the physical and psychological sciences present to it.

Every living thing from its own standpoint as a subject of experience is a spiritual activity and the development it undergoes is spiritual development. The potentiality of the individual becomes actuality. This means that the universe of our perception cannot be accounted for by any ordinary idea of external discovery, for the

world we perceive is not there to be discovered, and were it really alien we could not discover it by perception. The monadic principle recognizes that the whole activity of perception is spiritual activity. Its product is formed from within not impressed from without.

42. The twofold creative activity of the mind produces images and concepts. The images are particular and individual ; the concepts are universal. The images are the terms, the concepts are the relations. Whatever be the genesis of the life which develops itself in individual experience the whole form in which the individual finds self-expression is derived from within and not impressed from without.

Our conscious activity seems to be divided into two well-marked, clearly defined powers, perceiving and conceiving. Perceiving is original, and appears to be a purely receptive activity ; conceiving depends on it, and is a constructive activity. Plato held that in conceiving as well as in perceiving the mind is receptive. The Platonic theory of the Ideas or Forms is that universals or concepts are the reals of the intelligible world, and contemplated by our mind precisely as we contemplate the particular sense images which are the reals of the sensible world. In our ordinary thought, however, while we think our percepts are particular images of existent things, which present themselves to us when we

give attention to them, we suppose our concepts to be the active work of our mind. Thinking we regard as a logical activity.

The monadic principle requires us to identify reality with activity and activity with mind. The monad is defined by its activity, and its characteristic activity is perception. This implies a completely different notion of perception from the ordinary idea that it is awareness of the presence of objects revealing themselves by their sense qualities. The æsthetic form of our percepts is the active creation of our mind, quite as much as the logical form of our concepts. While however we find it comparatively easy to detect the logical activity we are never directly conscious of the æsthetic activity. We discover it only by reflexion and inference, for our æsthetic world must be already formed before logical activity or thinking can begin. If we had not a perception of the world there would be nothing for thought to think about. Yet the moment we reflect on perception itself we recognize that it cannot be a world existing in its own right, and revealing itself, because it is a pictorial world, representative of the real world. How then has the picture fashioned itself? There can only be one answer—a pictorial representation of reality supposes as a cofactor a subjective æsthetic activity.

The explicit recognition of the æsthetic activity of the mind, as distinct from its logical activity, is very late in the history of philosophy. It first comes into clear definition in Kant's *Critique of Judgment*. In the *Critique of Pure Reason* Kant

had distinguished a transcendental æsthetic from a transcendental logic. The only activity, however, which Kant assigned to æsthetic in the earlier work was the imposing of the forms of space and time on the manifold of sense. In the later work we have the development of a full æsthetic theory.

The difficulty in recognizing original æsthetic activity is the fact that we have in consciousness no non-æsthetic background out of which it can be seen emerging. The world of sense perception is always there as a world ready-made into which we are introduced.

43. The individual gives external expression to his internal intuitions without passing out of himself. This possibility is registered in man's organic structure. Man can express by articulation his inner thoughts and he can hear with his own ears the words he utters by his own lips. He can perceive by vision the work of his hands as it is being performed, he can discern in his accomplished deed the purpose it has fulfilled. The result is that all his thoughts and actions are self-reflected. The emotion which finds vent in the shout of joy or the cry of sorrow reverberates through his being in its utterance and also speaks back to the soul in the language it has created.

The key to the whole problem of language, how it arises and leads to monadic intercourse, is to be found in the monadic principle of the self-sufficiency of the individual. This principle does not imply that the individual can live the full individual life in isolation from other individuals and from social and political activities, or that the human individual can be indifferent to his membership of the human family. What is meant is that every relation into which the individual is able to enter depends on the fact that he is structurally and organically and physiologically complete in himself.

VIII

THE MECHANISM OF LANGUAGE

44. The nature of intercourse between human subjects is deducible from the structure and function of the human organism. It is because an individual can commune with himself by internal or external expression in articulate speech that he can communicate his thought to another. Thus the internal speech by which I express my thoughts to myself in words is not only inwardly articulated but inwardly heard. I can speak to myself aloud and in that way both hear myself speak and be heard by another. The degree to which my utterance will evoke responsive self-expression in another depends on the accord and unison and sympathy of the two natures and not on any mechanistic interaction between the corporeal organisms. A common language, which is the condition of intercourse, means that the articulate vocables in which the thinking of each individual finds self-expression are identical. Thus I can awaken by my speech rational discursive thought in my fellow-men ; in brutes I can only arouse certain emotional dispositions ; in lower forms of life only instinctive reactions. In all cases intercommunication depends on sympathy and harmony between self-intuitive, self-expressive, individuals.

> Assume an individual to be only capable of hearing the sounds another utters and incapable of associating in himself the sounds he articulates with the sounds he hears, by what conceivable means could he hold intercourse with his fellow ? Clearly the first condition of the possibility of intercourse is that the individual should be able to identify the sounds he articulates with the sounds he hears, that is, that he should be able to hear his own voice and recognize it as his own production.

45. There are *real* relations and there are *ideal* relations. Real relations are those by which movements are propagated in the physical world. They establish a connexion between bodies and the environment. The body is organized to be receptive to movements. The special sense organs are selective and predispose the organism to attention and to specific action. These real relations are the means of intercourse but intercourse itself is wholly ideal. Intercourse is an intercommunication of ideas and ideas are not interchangeable. Intercourse is mutual understanding by distinct subjects of experience, each exercising his own intellect and volition.

The characteristic intercourse of man is by articulate speech. The mechanism by which speech sets up an external connexion between individuals is the transmission of sound, that is a vibratory motion is transmitted point to point

from one physical body to another through the continuous media of our environment. The ideal relations between minds effected by these real relations is the spiritual work of interpretation which each mind performs for itself and on its own account. Each communicating mind interprets for itself and from its own standpoint the expressive form which articulation has imparted to the purely physical sound.

The distinction between the mechanical means by which intercourse is effected, and the spiritual activity implied in the intercourse thereby effected supplies us with a rationale of artistic production and gives us the principle of a philosophy of art. When we refer to works of art we have in mind the materialized expression of the artist's spiritual work in colour, tone or plastic substance. These materializations the artist has moulded and the beholder can contemplate and interpret. Yet these are only external expressions serving to communicate spiritual intuitions, the outside symbol of the inner spirit. The true work of art is itself wholly spiritual and imaginative. This true work of art is identical for the artist who has originated and produced it and for the beholder who appreciates it and reproduces it in his own mind. The marble, the pigments, or the tones are merely language, the mechanical means by which the spiritual work of art raises in each mind the internal imagery, and only language in so far as they are expressive. In this meaning art is linguistic.

IX

IDEAL ACTIVITY AND MATERIALIZATION

46. The ideal activity of the individual is twofold, theoretical and practical, an activity of knowing and an activity of willing. The real activity of the individual is the objectification of its ideal activity in actions.

Intercommunication between individuals is only by actions. There is in common discourse no direct relation between the understanding of one individual and the understanding of another, nor between the will of one and the will of another nor between the understanding of one and the will of another. Action in its objective aspect conveys from one individual to another the responsive understanding and mutual willing which intercourse implies. In action an individual can give expression to his own spiritual activity and by action he can arouse intellectual activity in his fellow.

Activity is inconceivable except as process or change. A unilinear succession will not of itself give rise to the concept of activity. Change implies the disruption of the simple, the bifurcation or dichotomization of the self-contained. Even if states of consciousness are reduced to the

self-sameness of a numerical series, the single members of the series are only distinguishable insofar as they bear in themselves the mark of their position in the succession, as they exhibit each for itself the difference of before and after. In conscious activity perception is focussed in attention to the present, and this gives to the moment of experience its distinctive quality, and makes the succession of conscious states a qualitative and not a quantitative succession. Consciousness is therefore not succession but change.

Do we perceive change? According to one theory of knowledge the objects of perception are sense data which exist in their own right and for their perception are dependent on the activity of attention. If this view be accepted, it would seem that not only is there no perception of change but no change to perceive, there is only an order of succession in the direction of attention. In this case change would be a concept arising by reflexion on the succession of acts of attention, rendered possible by the psychical fact of retention. In the monadic theory on the other hand change is directly perceived, and were there no change there could be no perception. For consciousness is expressed in moments of experience which are the duration of change. These moments are marked by sensation, not by the sensing of data. Sense data are the result of reflective analysis of sensation and are a residue of abstraction not a self-existent reality.

47. Ideal activity is internal, self-originated, and self-directed, and it expresses itself in outward actions. In actions percepts are conceptualized, ideas are objectified, and reality is materialized. Action gives rise to the distinction between the real and the ideal, between an inner world constituted of ideal relations and an outer world constituted of real relations.

Intercourse is the ideal relation between the understanding and willing of two individuals leading to common action. The influence passes from one to the other through the expression of each in his actions.

48. Language is art. It embodies artistic creation, it gives materiality to spirituality. Just as pigments, tones and marble serve painter, musician, sculptor to fix the external expression of artistic intuitions, and convey a meaning which can be recreated by the contemplator, so language fixes thought, enabling it to be communicated by exciting creative activity in speaker and hearer.

49. The characteristic and universal mode of human intercourse is articulate speech. The mechanism of articulation has attained functional perfection in the human organism which would seem to have been specifically transformed in its

evolution towards that end. This function, together with the power of manipulation developed in the forelimbs, prescribes the range of human activity and marks the lines along which human actions are performed. It is this natural adaptation of the organism which makes intercourse appear mechanical and automatic. We can give meaning to the words we utter or to the work of our hands, making them expressive of our thoughts and imaginings, and we can read meaning in the words we hear or in the works of art which other hands have fashioned.

50. Intersubjective intercourse objectifies perceptions. It detaches *esse* from *percipi*. It separates mind and world, spirit and nature. The mutual reference of subjects of experience to their perceptions through the medium of outward self-expression sets up in each subject the concept of an independent external space-time to which its perceptions are then referred.

X

THE PHYSICAL UNIVERSE

51. The common world of intercourse is not the real universe of monads. The world of intercourse is the objective world of our perceptions, abstracted from the subjectivity of the mind perceiving, and from the form which perceptions receive by reason of the mechanism and instrumentality of the sense organs. An objectively independent world is vaguely postulated by common sense, methodologically formulated by science, and constructed by mathematical relations.

Our ordinary and natural reflexion on experience leads us to regard the universe mirrored in perception as an outside reality and to regard the mind which receives the image as a subjective idealization with no real efficiency. The reality of the world appears in no way to depend upon mind, and mind appears to be in the world not as an effective part of its mechanism but as an interested observer whose activity is simply and wholly ideal.

Philosophical reflexion at once brings to light that the perceptions of the mind are ideally within it ; that the order of perception is an ideal order ; and that if there be a reality effectively outside the mind it must lie behind and beyond the perceptions which reveal it.

To this extent there is general agreement in philosophy, but there is wide divergence in the theories concerning the nature of this outside reality and the way by which it becomes known. Notwithstanding the great diversity of opposing theories—realisms, idealisms, pragmatisms, scepticisms, criticisms, absolutisms, relativisms, monisms, monadisms—the alternatives reduce to two. Either the world of physical reality, the physical universe as distinct from the subjective world of perception, is revealed to the mind in perception, or it is a construction which perception requires the mind to undertake; either the mind interpolates its thought into the world or the mind extrapolates the world by its own activity. The older science unhesitatingly adopted the first alternative, modern mathematical and physical science now inclines heavily towards the second.

52. The existence of objective reality effectively independent of the subject of experience may be postulated. It cannot be demonstrated. The essence of every object affirmed to exist refers to experience and can only be expressed in terms of experience. When the independent existence of an object of experience is postulated it is in the interest of a particular scientific methodology. If the postulate is supported by an appeal to common belief, such common belief rests on animal faith, or unreflective reason, not on intuitive insight or logical inference.

Aristotle distinguished the act from the power, and in modern philosophy John Stuart Mill defined a thing as a permanent possibility of sensations. These distinctions serve to direct attention to a notable fact concerning the nature of existence. All real existence consists of potentiality, not actuality. The aggregate of all that is actualized at any given moment would not take account of what exists at that moment. Potentialities exist whether they are actualized or not, and in their reality are quite indifferent to their actualization. If, for example, we consider our present existence at the present moment, the actualization of that existence in the moment is no more than its insertion into reality, and this is consciousness of a point insertion in a reality which exists simultaneously in space and successively in time. How then do I conceive this universal space-time reality in which I am inserted ? Not as it is actualized in the momentary experience of the countless individuals who live in the moment. Of this reality I have no conception. I conceive it as the present possibility of my own experience, as infinite potentiality impossible of actualization. I cannot be in two places at one time ; when I think of another place from that in which I am I think of it as it would be for me were I there, not as it is for whoever is there. It is the same with events in the past. The real event " Cæsar crossed the Rubicon " is not the actualization in particular moments of particular sense experience in individuals then living. The real event is the might-have-beens which that event

implied. Those potential might-have-beens are none the less real, were none the less existent in the event, because the event itself determined which one among them was actualized.

To confine reality to the actual and to deny reality to the possible would be to reduce existence to nonentity, to make it consist of point-instants without extension or duration.

When we think of the world which existed before us, before human life had appeared, we think of it as the existence of potentialities which for us are necessarily potentialities only, a world as it would have been experienced had we been living in it. We may indeed think of it as a world which actually was experienced by those who did live in it, but then we affirm an existence of which we can have no knowledge and indeed of which we can form no idea. There was, for example, a world which the dinosaurus inhabited. In its actuality it existed in the experience of the dinosaurus. In its potentiality it is what it would have appeared to me could I have been actually inserted in it. This potentiality is real notwithstanding the fact that, in the very terms of it, it is unactualizable.

53. The physical reality postulated by science as " nature closed to mind ", or as " existence effectively independent of the observer ", is the idea of the natural world as it would appear to a percipient whose perceptions were undistorted by perspective. The absolute world of physics

is the world which an infinite mind might perceive. Theoretically such an absolute world and infinite mind are conceivable. Practically the concept is self-destructive. Mathematically an absolute world and an infinite mind are alike limiting concepts. In actuality perspective enters into all perception and is of its essence. All perception is apprehension of multiplicity from an individual standpoint which is unity.

54. The defect which abstractness introduces into the scientific concept of reality is seen in the antinomies of reason. Space, time and matter are self-contradictory concepts when taken as absolute, and mutually inconsistent in their relations to one another. Space is the concept of the universal and necessary container of matter. Time is the concept of the universal and necessary container of process, and therefore the condition of the existence of movement and change. Matter is the concept of space-content or space-occupancy enduring continuously through time succession. The inconsistencies in the concepts of space, time and matter, due to the geometrical properties of infinite divisibility and infinite extensibility, have been familiar since ancient times, but the inconsistency of the relation of space to time and of these to matter has only been made explicit in modern thinking.

The story of the non-Euclidean geometries is now familiar. They arose out of the long search for a proof which would dispense with Euclid's postulate of parallelism. The concept of space as a homogeneous, qualityless extension, the subject-matter of pure geometry, ought itself to be a sufficient ground from which to deduce the fact of parallelism. In fact parallelism ought not to be a postulate but deducible from the concept of space alone. It was accordingly sought to prove the axiom without the introduction of any equivalent axiom, and the various and repeated attempts are a long story. All were hopelessly unsuccessful. In 1856 Lobatchewsky inaugurated an entire revolution in the science of geometry by shewing that no contradictory results follow if the postulate is dispensed with or replaced by another. This meant that Euclidean space is the space for which the axiom of parallelism is postulated. If another axiom be postulated the space will be elliptical or hyperbolic as the case may be.

The interest in the problem could not long be confined to pure mathematics, for physical and metaphysical concepts were involved. The question at once became important, What kind of space is the space of our universe ?

We are now able to see why Newton's laws are an approximation and yet only an approximation to the true laws of Nature. The law of gravitation is irrational, or conversely, the universe in which such a law is supposed absolute is inconceivable, if the space of the universe absolutely conforms to the postulate of parallelism. The

universe would in that case be infinite and uncontained and such a conception is self-contradictory. A universe to be a universe must be self-contained. Yet the bounds of the universe from our terrestrial system of reference are so vast that relatively to us as observers the approximation to parallelism is so close as to make the divergence negligible for all practical purposes.

XI

THE INTELLECTUAL MODE OF ACTIVITY

55. The modern theory of the evolution of life has made it impossible to regard the human intellect as absolute, or even to exalt it to the dignity of establishing the norm of truth in the apprehension of reality. The modes of experience which pertain to the infinite varieties of living experience are not distortions of one privileged mode realized in the human mode of activity. They are not derivatives of, nor referable to, the human intellectual mode, however closely they may be related to it in their genesis by the common origin of all modes.

The modern theories of evolution have undermined the intellectualism of the older philosophical systems. Sentience, consciousness, perception, understanding, reason, were regarded as degrees of enlightenment and a rise from obscure to distinct ideas. There was thought to be an ascent in the psychical scale concomitant with an ascent in the biological series in which different ways of knowing and different modes of awareness were degrees or levels of attainment, from the partial to the perfect, from the mist and darkness of the sensuous to the full light of the rational. The endlessly varied forms of organization and the endlessly varied modes of

apprehension were thought to differ only in the degree of illumination and in the kind of special interest engaging the attention of living things. According to the theory of creative evolution the modes of apprehending the objective world and the forms which the objective world assumes are as specific and as direct an outcome of evolution as the structures and functions of the particular organisms. The form of the objective world and the mode of apprehending it are mutually determined by the range of activity of the species and its organizations for a specific kind of action. Instead of the assumption that the tropisms of the plant are a primordial form of awareness, which develops in a continuous ascending scale, through the instincts of animals, to the intelligence and deliberative reason of man, the vitalist and activist theory is that the form of reality is correlative to the mode of its apprehension and this is determined by organization. Instinct and intelligence are different in kind and divergent in direction and development. Thus according to the theory of creative evolution the intellect of man has been evolved to effect a falsification of the real in the interest of action. The intellect spatializes and geometrizes a reality which is a duration and thereby imparts fixity to what is really a flux.

56. Experiment has established in physics the fact that there exists for observers of natural phenomena no absolute system of reference, spatio-temporal, material or ethereal, by means

of which the perspectives of individuals can be corrected, unified and verified. There is no criterion to which our perceptions can be referred and their accuracy tested. All observations of celestial movements by terrestrial observers are observations of relative movements which take the earth as a system at rest ; or at least use coordinates for a system of reference which has zero velocity relatively to the velocities of the systems observed.

57. The reality of physics is a logico-mathematical construction. This construction is grounded in a necessity of the monadic nature. It is a pre-condition of a free activity, that its perception should present to it a coordinated universe, otherwise it could not express itself in imagery or give form to its actions. Further, it is a pre-condition of the free movement of an active subject of experience that there should be a fixed frame of reference relative to the movement. The rational monad, therefore, is under the necessity of coordinating the universe, and this coordination must anticipate its experience.

58. The measuring, by which the coordination of the universe is effected, presupposes : first, a fulchrum or fixed point from which the axes

of coordination are operated ; and second, the possibility of measuring equal spaces in any direction and equal intervals of time.

59. In nature, as it is presented to the mind in perception, there is no absolute system of reference relatively to which velocities can be measured, no system able to serve as a fixed standard for all coordinators. Every system of reference of which we have actual experience or which is open to our observation is moving relatively to other systems. It is useless therefore to seek the principle of coordinating activity in nature, presumed to be external to the mind and independent of it.

60. As matter of fact we encounter no difficulty whatever when we pass from one system of reference to another. This can only be because we conform automatically to the principle that whatever system of reference we enter it becomes by reason of our entrance a system at rest relatively to all systems in movement. When we occupy a railroad carriage or the cabin of a ship, and so attach ourselves to a system moving relatively to the earth, we do not experience any shortening of the length axis of our space in the direction of the movement,

though such a shortening is theoretically deducible and would be observable by an unattached observer. Moreover it is impossible to be conscious of the adaptation. Thus while we know the earth is a sphere all our charts and maps are Mercator projections.

61. The coordination of the universe as a physical system, with objective laws of nature and a real as distinguished from an ideal existence, is a work of extrapolation. The rational monad enjoys a practically perfect freedom in the selection of a system of reference on which to base the logical and mathematical work of construction. While it is impossible by sentient experience to have conscious perception of the movement of the system to which the observer is attached, the movement can be calculated relatively to any system which may offer an advantage. Thus while earth dwellers are unaware of the movement of their planet relatively to the other planets and to the fixed stars which they observe, that movement can be calculated for any system and on any principle which they may select. The Copernican discovery was in essence the discovery that such a choice is possible. It was found more convenient in science, and simpler for astronomical calculations, to select a heliocentric system in place of a geocentric system.

The principle of relativity is the most metaphysical, and in this regard the most fundamental basis of the new scientific concept of the physical world. It is a mathematical principle for it concerns space, the subject-matter of geometry, and time, the subject-matter of arithmetic. It interprets space and time in an analogous way to that in which physics now interprets mass and energy. Just as the discovery of radio-activity revealed the inseparability of mass and energy and the need of a unit into which both factors enter in indissoluble union, so the principle of relativity reveals the inseparability of space and time and the necessity of taking a unit in which the three dimensions of space and the one time dimension mutually and automatically compensate variations consequent on the relative movements of space-time systems, in order to maintain a constant ratio. It finds this unit in the velocity of light. Thus the astronomer coordinates the distances and intervals of the stellar universe by light-years, that is, by the distance which a ray of light, moving at the velocity of approximately one hundred and eighty six thousand miles a second, travels during one revolution of the earth in its orbit round the sun. A light year is therefore about six million million miles. The astronomer has not first to determine the absolute duration of the second or the absolute length of the mile, he has in fact no possible means of doing so. The value of the distance can only be expressed by referring to the duration of the interval and the duration can only be expressed by referring to the distance

traversed. Anyone who would measure therefore the distance in space and the interval in time which separate any two events from one another must choose a system of reference from which his measurements will be made and for which they will hold good. Before the experiments which led to the principle of relativity astronomers supposed that we had in the fixed stars a system of reference which gave us the means of determining absolutely these distances and intervals. It has now been proved that there is no absolute system, but that any system we choose is moving relatively to all other systems. Physics must have a universal constant and the principle of relativity takes the velocity of light for this purpose. This velocity admits of a mathematical determination or constant ratio which holds good for all systems of reference. At first this appears a paradox, but it admits of the simplest interpretation. When we say that the velocity of light is unaffected by the movement of the system in which the light has its source, we are merely stating, in the objective form of physics, the subjective fact which we can easily verify in experience, the fact that we cannot be conscious of the movement of a system to which we are attached, by any changes within it due to the movement, we can only infer its movement, if we think it is moving, by interpreting observations of things outside, if there are outside things to observe.

The other principle which has contributed to bring about the modern scientific revolution is the quantum theory. The principle of relativity

concerns the relations of space and time, the quantum theory the relations of matter and energy. The principle of relativity requires us to conceive space and time as covariable ; the quantum theory enables us to conceive matter and energy so constituted as to change from one to the other by simple alteration of form.

Both the principle of relativity and the quantum theory are new ways of conceiving continuity. The principle of relativity is the principle on which space and time pass into one another. It rejects the idea of space-in-itself independent of time or of time-in-itself independent of space. The physical world is four-dimensional and the distance which separates any two events is relative to the interval of time between them. Coexistence and simultaneity are alike relative to the system of reference from which phenomena are observed and coordinated. Such a conception is clearly impossible if we try to think of the union of space and time as a point to point correspondence between positions and intervals. Underlying the new principle of relativity, therefore, as its logical ground and metaphysical basis is a new conception of continuity. The new conception is that space and time are continuous in a meaning of continuum which excludes discreteness. If we conceive space and time as discrete, that is, if we conceive space as the aggregate of points and time as the aggregate of successive instants, the points having minimal extension, the intervals minimal duration ; then a covariance of space and time is unworkable in practice and unthinkable in

theory. Zeno's arguments to prove the impossibility of movement are the standing illustration of this inconceivability. The principle of relativity requires, therefore, for its covariance thesis the continuity of the spatial and temporal dimensions in a meaning which implies inseparability, not point to point correspondence. Physics meets with an analogous problem in the relation of matter and energy, but in this case it is discreteness not continuity which is required in order that there may be covariance between the two forms of energy—mass and radiation. Both must be conceived as discrete. Matter is atomic and therefore discontinuity is essential to the concept of it, but it seems impossible or even paradoxical to conceive radiant energy otherwise than as continuous. That is to say we conceive radiation as continuous in precisely the same meaning of continuity as that which we ascribe to space and time. Were energy really continuous in this meaning the existence of the physical world would have to be thought of as a succession of momentary states arising and perishing. The quantum theory or the discreteness of the emission of radiation saves the situation. The theory is formulated to interpret certain spectroscopic phenomena which indicate that the emission of radiant energy from atoms is not a continuous flux but a successive pulsation. We may illustrate the atomic phenomenon on a large scale if we take an imaginary case and suppose the sudden disappearance of the moon from its orbit and its reappearance in a nearer orbit with no time

interval and no occupation of intermediate positions and the discovery that this was due to the escape from the terrestrial system of a definite, compact, indivisible, individual unit of energy. If similarly we suppose the change instead of being to an inner to be to an outer orbit and that this was due to the accession of a unit quantum of energy, we should then be imagining as occurring on the earth what we think occurs in the atoms. It is upon this empirically observed spectroscopic phenomenon that the quantum theory is founded. The theory thus comes to save the situation. It postulates a minimum constituent quantum of energy, constant throughout all changes, and this while it permits infinite change and variety enables us to set a limit to dispersion and to see systems integrated as well as disintegrated. It enables us to take radiant energy as the ultimate condition of the structure which we apprehend in the familiar concept of the physical world.

XII

SENTIENCE AND TRUTH

62. The monadic principle is the only one which completely reconciles sentient experience and scientific truth. All reality is sentient experience and nothing exists save insofar as it enters into and forms an organic part of some active subject's experience. Yet experience itself must be schematized in order that action may be effective. Just as the atomic system of physics is a conceptual construction which schematizes the spectroscopic analysis of radiant energy, forming a working model of an imagined mechanism, so the real world of science is a conceptualized diagrammatic scheme, mathematically deduced from the actual process of measuring.

63. Thus the reality of sentient experience is immediate, primordial, absolute and ultimate. Whatever is experienced *is* in the most absolute meaning of existence. However trivial in itself, fleeting and transient a particular experience may be, it cannot be unmade or altered, recreated or annihilated.

The reality of the physical world or of nature is a mediated reality. It is an ideal construction undertaken in the interests of order and under

the necessity of practical activity. It is continually being reformed, unmade, remade, to comply with the exigencies of new experience and the results of test experiments.

64. Sentient experience is individual and monadic. It is owned and untransferable. The real universe therefore consists of the monads. The continuity of the real universe is not spatio-temporal, for space and time appertain only to the representation of the universe. The principle of continuity is the principle of community, that is, the principle by which monads can be members of a community. Real continuity is exemplified in the living organism, in which the individual activities are members one of another. The continuity of the real universe is an organic continuity. In the universe the lowliest monadic activity is essential to the life of the whole, and the principle of monadic continuity is expressed in the maxim, " Whosoever would save his life must lose it ".

65. The monadic principle of continuity reconciles complete liberty of action in the individual with complete determinism in the universe. The old difficulty of free-will arose from the presentation of continuity as essentially spatio-temporal. So presented the absolute position of

every object is determined by every other object and the absolute occurrence of every event by the time order of all events. Spatio-temporal continuity is perceptual not existential, it belongs to the representative aspect of the universe in the monad's perception. The determinism of nature depends on the objective presentation of nature in sense perception. The object of perception is necessarily determined by the order of perception, (*a*) by space, the order of co-existence, (*b*) by time, the order of succession. Herein appears the illusion of common sense. We suppose we cannot know things in themselves but that we can know the world. The reverse is the truth. We can know there are things in themselves for we know there are minds, our own and others. What we cannot know is the world of another's perceptions. It is the mind which perceives the world, not the world which the mind perceives, the thinker, not his thought, which exists in its own right.

XIII

THE PRINCIPLE OF CONTINUITY

66. The category of continuity has a different logical reference in psychology and biology to that which it has in geometry and arithmetic. In the physical and mathematical sciences the forms of continuity are space and time and the principle of continuity is the principle of the discreteness, manifoldness, multiplicity, atomicity of the real. Continuity as a principle of the monadic universe is the principle of psychical or organic integrality. The unity which is intended by psychical continuity is not the principle of the inclusion of independent parts in aggregates or classes. It is the principle of the identity of a subject in its activity ; of the identity of power, force, or energy, in its expression ; of the identity of unity in variety.

67. The psychical principle of continuity is expressed in the concept of community. Community is not an external relation between members but the principle of organization. It is not interpenetration but symbiosis on a universal scale—the dependence of the activity of every monad on the independent activities of all the monads. Symbiosis is the biological term for the principle conditioning living activity when

two distinct forms of individual activity can only function in association. It characterizes the lowliest forms of organic life, the algæ and the lichens, and there are indications that in some form it is a condition of the vital function itself.

68. Community in the living world has two forms. It is natural, a direct outcome of organic evolution, or, it is spiritual, a free association of independent individuals.

69. The natural association of individuals of the same species is met with everywhere in the vegetable and animal world and may be said to be the condition of the generative function. It exists in primitive and in highly developed forms. Its highest form is seen in the social life of ants and bees : a highly organized common life which appears to exclude the possibility of freewill association.

The human form of community raises man above animality and introduces him to the spiritual life. Spirituality is not a quality of human mentality, nor is it an instinct implanted in human nature, it is the expression of the fact that man by reason of the evolution of his peculiar type (the erect form, the convergent vision, the integration of hearing and articulation) is able to and actually does enter into communication

ideally not only with the minds of his fellow individuals present with him, but with those who have lived before him and found means to leave records.

70 In humanity we meet with a phenomenon which is unique, the appearance of an intellectual life superposed on a natural life—the phenomenon of civilization. It marks in man an achievement and an outlook. The spiritual principle working throughout the activity of living evolution is emancipated in human nature, set free from environmental conditions, able to organize itself as a realm of ends. Human civilization is the expression of this spiritual freedom. The future lies open to man in a meaning which does not apply to any other form of organic life. In the language of religion, man is revealed to philosophy as formed in God's image, as working with God, shaping his own destiny, having knowledge of good and evil.

XIV

THE KNOWLEDGE OF GOD

71. God for philosophy is the idea of necessary existence. The only proof of the truth of the concept of God which is cogent in the ultimate metaphysical meaning is the ontological proof. The cosmological and the teleological proofs derive their cogency from it. The God of philosophy is not a creature of the imagination nor is it an intellectual construction, it is the concept of the supreme being or ultimate ground of existence. The existential judgment applied to God is tautological because in the concept of God existence is a necessary idea. The concept of God is the condition of consistent thought about reality.

72. It is human personality which gives rise to the problem of theism. If the human subject of experience is a person, in the absolute meaning of the term, implying self-originating and self-directing activity, then his relations with other persons are ideal. If the Supreme Being is conceived as a person then man's relations to that person are ideal and human dependence on God is the dependence of responsible agents on an over-lord. The relation of man to God then

presents an analogy to the relation of fatherhood, kingship and the like, although the relation must be considered as transcending all analogies, inasmuch as the Supreme Being must stand in the unique position of being the dominant entelechy. In theology this is the philosophical basis of the doctrine of freewill. If on the other hand we conceive God as substance, then man's relation to God is not ideal but adjectival. Human personality in such case can only be conceived as a modal appearance of the divine substance. In theology this is the philosophical basis of the doctrine of determinism or grace.

73. We do not know God as we know the objects of the perceived world by sense experience, and our knowledge of God is not conceptual like our knowledge of the objects of mathematics and physics. We know God when we apply reason to the interpretation of experience. In this sense God is not an object of knowledge. In knowing God we are not making acquaintance with a previously unknown thing or person, we are recognizing the implications of the living activity in which our individuality has its source.

> Whatever may have been the origin of the commandmant to make no image of God it stands for one of the great illuminations of the human mind. The truth it expresses is that the

God-idea is not based upon and cannot take form in a sense image. The fact that this truth took shape in a commandment set the human mind free to evolve a philosophical concept. It gave the Hebrews a moral advantage over the Greeks notwithstanding the great pre-eminence of the Greeks in art and philosophy. The Greek philosophers found themselves heavily handicapped by the æsthetic creations of the poets and the plastic forms of the sculptors and painters. " God is a spirit " means that God is known by a concept and not by an image, known ideally and not sensibly.

The monadic principle enables us to see the philosophical ground of this distinction. If God could be imagined then he would fall within the universe of our perception and there is no place within the universe of perception which could contain God. The monadic principle also enables us to avoid a false step in regard to perception which would seem otherwise unavoidable. We have not to confront the alternative *either* perceptible *or* non-existent. God in the monadic scheme is the idea of infinite individuality and transcendent personality. Even the finite individual as individual has no place in the æsthetic imagery which gives expression to the mass effect of the perceived universe. *A fortiori* infinite individuality must be independent of perception.

The God-idea is, then, the idea of an overruling or dominant monad, analogous to the entelechy of the finite individual, conceived as the source, sustainer and director of the monads themselves.

God stands in relation to the world as the mind stands in relation to the body, but the world to God is not the world as imaged in our perception, it is the world in its reality as the realm of free spirits.

74. The human mind is deceived and misled by its own intellectuality. The simplicity and finality of mathematics engender a false security and an exaggerated estimate of the mind's powers. Our individual lives are lived through in the completest ignorance of the source, the nature, and the mechanism of the vital processes themselves. However far our analysis of the materiality and spirituality of the organism is extended by biology and psychology we are never brought in sight of the limiting conditions. We conceive physics as a science which resolves external reality into transparently simple quantitative combinations, but in biology we have to recognize infinite complexity in the most elementary processes.

75. The worship of God is distinctive of man, and God is the object of religious experience. Man is a religious animal. He worships God, but the God whom he worships is an "idol of the tribe". To become the God of religion, the God of philosophy, a pure concept, must be presented in imaginative form, and all imagery is sensuous.

"Men make themselves, as it were, the mirror and rule of nature. It is incredible what a number of idols have been introduced into philosophy by the reduction of natural operations to a correspondence with human actions ; that is, by imagining nature acts as man does, which is not much better than the heresy of the anthropomorphites, that sprang up in the cells and solitude of ignorant monks ; or the opinion of Epicurus, who attributed a human figure to the gods". (Bacon, *Advancement of Learning*, v. 4.)

We may see in this struggle of reason against a natural disability the motive of mysticism and its rational basis. The mystic is unsatisfied with a mediate knowledge of God. What image or what concept can represent adequately the source from which reality flows, the goal to which reality moves ? Even the ideas of a whence and a whither are inapplicable to the God in whom we live and move and have our being. The mystic wants the immediate knowledge of God, the knowledge unmediated by image or idea which like the immediate knowledge of existence in knowing is one with what it knows.

76. Worshipping God, the religious act, is the manifestation in man of his high attainment in material and spiritual evolution. Religion is only possible for the emancipated or free individual, that is, for rational creatures able to detach the ideal from the actual. Individual freedom is the conditioning factor in the religious act.

77. The free individual has a finite existence and an infinite essence. The existence of every finite individual is limited to a point-instant of an order of coexistence and succession. It is completely conditioned by the spatio-temporal series, determined by that series as well as itself a determinant of the series.

In relation to the whole space-time series, or, more precisely, in relation to the other members of the series, the existence or non-existence of a particular individual is absolutely indifferent.

In essence, on the other hand, the free individual has no limitations ; space and time are within his comprehension ; all reality takes form in his imagination ; all activity conforms to the principles of his reason.

78. To the æsthetic consciousness humanity appears to be acting its part on a stage prepared for its action. The play is in progress and we cannot know whether the event will disclose it to be a tragedy or a comedy.

To the scientific consciousness, humanity is a particular phenomenon of a larger reality, Nature. For science, man is the mechanistic outcome and contingent product of blind interacting forces. Like myriad other phenomena he has made his appearance, will endure for a time and pass leaving no trace.

To the religious consciousness, humanity is the mode or the manifestation of an indwelling God fulfilling the purpose of history as the unity of time succession.

To the philosophic consciousness, humanity is the absolute, in the sense that the whole problem of reality can only be presented and represented in its human meaning. In philosophy, the perceptual world of æsthetics, the intelligible world of science, and the spiritual world of religion fall within humanity.

79. Humanity is individualized in man, and man is universalized in humanity. Hence there arises in philosophy the problem of knowing and being, of the relation of truth to reality. The reconciliation of this problem in monadology consists in the affirmation of the absoluteness of the real and the relativity of the known. The real universe of active monads is known by each monad as it is mirrored in its perception and determines its action. Every monad is in and for itself and in ideal relation to all the monads which constitute the universe.

XV

THE IDEAL OF TRUTH AND THE LIMITATIONS OF KNOWING

80. The goal of knowledge is truth, the adequate representation of reality. Truth, like the perfect reflexion of a mirror, is the exact ideal representation of the actual.

Philosophy in its search for truth has to encounter an opposition from which science in the accepted meaning of the term is free. Whoever philosophizes finds in the philosophic effort a continual straining not against an outward obstruction but against a bias which is a part of human nature itself. The whole history of philosophy is illustrative of this fact. Philosophy progresses, not by a steady accretion of new knowledge, but by a movement of a strophic-antistrophic, synthetical-antithetical, speculative-practical character. Our rational life would seem to depend on a mental bias which drives us now toward now against reason. The whole spur to research is the innate wish that the real should be rational and yet we are held back by an instinctive conviction that the wish is chimerical and can never be satisfied. This strange phenomenon is equally evident whether the direction of the mind be sceptical or dogmatical. Hume in the *Treatise on Human Nature*, speaking of the impossibility of suppressing the sceptical attitude in regard both to reason and to

sense knowledge, and the equal impossibility of maintaining the sceptical attitude in the practical concerns of everyday life, says : " I take it for granted, whatever may be the reader's opinion at this present moment, that an hour hence he will be persuaded there is both an external and internal world ".

This bias in human nature, which takes the familiar form of common-sense, which brings it about that the most unanswerable arguments have to give way before a force of unreason, is itself the greatest of all the philosophical problems. In the history of human thought we meet with the successive rise of great deductive systems. All are, it is true, the work of individual philosophers—for example, Plato, Descartes, Hegel. Each challenges us by its logical unassailability, and even if it be logically assailable, it is not by logical frontal attack that it is overthrown. Our reason may assure us of its theoretical truth, yet the moment we try to realize its consequences in practical life we become conscious of a hidden opposition in human nature, as when a swimmer discovers he is swimming against the stream. No system of philosophy has ever achieved even the ordinary triumph of a verified scientific hypothesis, and this failure is difficult to understand seeing that the principle which every philosophical system invokes is the primacy of the intelligible over the sensible, and this is the principle of reason itself.

It was this problem that Plato dealt with in his allegory of the den. Our minds are chained as it

were, to a position which gives us an outlook only on the reflexions or shadows of the sense world and turns us away from the realities of the intelligible world. And again, in his mythical account of the journey of the soul, he makes it pass through the waters of Lethe before it comes to birth. In contemporary philosophy the problem is the main theme in Bergson's theory of creative evolution. The intellect, itself an outcome of evolution, is a mode of practical activity with a definite utility value in action and not a natural illumination revealing truth.

Although for the most part science is free from this bias, being itself practical and proceeding as a direct enlightenment of common sense experience, yet every now and again it, too, encounters the same opposition as philosophy. In the theory of relativity science has in effect offered a new deductive system of reality, comparable with the great philosophical deductive systems. We may describe it as a pan-mathematicism in the same meaning as the Hegelian system is described as a pan-logicism.

The principle of relativity has been formulated by mathematicians and physicists and it originates in experimental science, yet with something like dismay its propounders see their basic ideas of space, time and matter dissolve, and notwithstanding its empirical origin the principle has to meet the strong opposition of the bias in human nature towards common sense realism. This bias shows itself in an instinctive rejection of idealism however logically deduced.

81. For the mathematicians and metaphysicians of the modern period, before the scientific revolution of the present century, truth was the representation of the universe as perceived by God, that is, as it would appear to an omniscient mind, absolutely free from the distortion, confusion and obscurity, due to particular perspectives or individual standpoints.

To the scientific materialists today truth is the apprehension of objective existence in intelligible concepts, free from the subjective conditions of sense presentation, and corrective of the perspectives implied in individual viewpoints.

82. The two ways of expressing the ideal of truth, the subjective way of the metaphysicians and the objective way of the scientific materialists, are identical. Both rely on the presupposition of a reality geometrically absolute. In the one case there is posited an apprehension of reality free from perspective, and in the second, a principle by which perspective is nullified. The concept of an omniscient deity excludes the limitations of an individual subjective viewpoint, and the concept of an objective intelligible reality excludes the relativity which characterizes the cognitive experience of finite individuals. Hence the ideal of truth for both is the attainment of adequate representation of a reality geometrically absolute.

83. The attainment of this ideal and the construction of metaphysical science as the basis of physics has been continually striven for throughout the history of philosophy. The enterprise has not succeeded. To common sense and to science a geometrically conditioned absolute appears the self-evident implication of cognitive experience. If our view of the universe is relative to our position in the universe, it would seem to follow that there is a universe indifferent to our point of view. If then there be true knowledge it would seem that we are confined to two alternatives in interpreting its genesis: either, it is generated by the geometrically absolute universe, or, by the mind contemplating that universe. There are many conflicting opinions, and many forms of each class of theory of knowledge, but there exists no logically unassailable doctrine of the relation of truth to reality.

84. The advance of mathematical and physical science in the recent past and in the contemporary period, and, concomitant with the advance, the invention of instruments of precision of ever more refined delicacy, have made it possible to bring to experimental test this hitherto universally accepted principle of a geometrical absolute to which the reality of the universe and its represen-

tation, that is its truth, are referred. The result has been to discredit the principle completely. Physical science has found itself under the necessity of reconstituting itself in accordance with a new principle, the principle of relativity. This is the modern scientific revolution, greater in its universality, profounder in its metaphysical import, than any revolution in thought in the historical evolution of human culture.

85. The principle of relativity entails a definite breach with the old concept of a geometrically conditioned absolute in both its forms, subjective and objective. The omniscient God of theology and the space-time absolute of materialism give place to the concept of a pluralistic universe, not pluralistic in the derivative meaning that the universe admits an infinity of perspectives, but in the absolute meaning that the simple reals which constitute the universe are non-interacting and only ideally related.

86. With the new principle there comes into view an entirely new concept of the nature of the limitations of knowledge. To the older principle limitation was implied in the finiteness of the individual. Theoretically perfect knowledge, universal in extension and adequate in

intension, was conceivable and exists in God if God exists. To this ideal perfection of knowledge in God, the older principle admitted an infinite approach, but all finite knowledge must fall short, limited by the conditions of individuality.

With the principle of relativity this theoretically perfect knowledge and this independently existing reality become alike self-contradictory concepts. The limitations of knowledge lie for the new principle not in the finiteness of the individual but in the nature of individual existence. To the perceiver the object of perception is, and only can be, idea. There can be no external contemplation of an external world. The observer of nature surveys the universe from a central position within. The centralization of his viewpoint is absolute. If we compare knowledge to reflexion in a mirror, we are ourselves the mirror and our knowledge the reflexion. There is no way of standing aside as privileged onlookers comparing the reality with its reflexion. To imagine ourselves making an act of comparison between the reality and the idea, in order to discover whether the thought agrees and corresponds with the thing, is to imagine the mirror passing out of itself in order to survey the image reflected in it and judge its truth. It is in a quite other meaning that the principle of relat-

ivity implies the limitations of knowledge. Knowledge is limited, not because the knower is finite, but because what belongs to the knower as knowledge is idea not reality. This is the monadic principle and it applies equally to the supreme and to the lowliest monad.

87. Monadology does not seat us on God's throne and give us a synoptic view of all reality. It gives us a principle of interpretation ; it points a direction along which thought can move consistently ; and it yields a metaphysic of reality which serves as a sure basis of physical science.

88. Monadology introduces us to a new concept of infinity. Alike in physics and in metaphysics the infinity of the universe takes on a new meaning.

In physics, every observer of nature finds himself attached to a system of reference and can only coordinate the universe and determine laws of nature by regarding all movements as relative in their velocity to this system at rest. The zero of velocity is not attributed to an assumed absolute but to the system chosen. Theoretically and for mathematical coordination there is no limit to the choice of systems of reference. In this meaning, and no longer in the old meaning of an absolute extension and succession, the universe

is infinite. There is no limit, within or without, above or beneath, in the atomic system or in the galactic system, to the possible ranges of monadic activity. The monadic principle itself secures the constancy of the norm in the endless possibility of the change of system.

In metaphysics, the monadic principle shows space and time within the monad and the infinite possibility of ideal relations between the monads.

89. The universe is a pluralism of persons, not a pluralism of things. Monadology is, therefore, in its primary conception, consistent with the concept of human freewill. It finds in freedom a principle of the real. The conception of activity existing in finite centres, developing freely in subjects by means of ideal relations, rationalizes the concepts of creation, of novelty and of real becoming.

90. It is because life is in essence consciousness or mind that we know ; it is because knowing does not transcend life that knowledge introduces us to the spirituality of the real ; and it is because the real is spiritual that we know existence as value—beauty, truth, goodness.

POSTCRIPTUM

Hypotheses non fingo

A great part of philosophy is an *apologia pro vita sua*. When we ask the question, "What is philosophy?" we cannot answer by referring to some class of things, or some kind of facts, or some series of events, which can be the subject of special treatment to elucidate their nature. The subject-matter of philosophy is "the whole choir of heaven and furniture of earth" and the difficulty of philosophy is that in the object of inquiry is included the inquiring subject. In the sciences we are continually engaged in verifying hypotheses, in philosophy we make no hypotheses. If we start philosophizing with assumptions, such for instance as the assumption we all make in practical life, that the world we think about exists in effective independence of our thinking, the initial assumptions will reappear in our conclusions. Philosophy would know the real as it is and finds no pathway from thought to reality. The thinker is always within his world and the world he thinks about is his idea.

The great stumbling block in the way of philosophy is the unwillingness of philosophers to accept this fact. We desire almost passionately to circumvent it. We call it solipsism and heap contumely on it, treating it scornfully as the acme of self-stultification. Yet is the fact always with us. The idealist may close the cupboard-door on the skeleton, the realist may affect to ignore its existence. It is in vain.

The ordinary way of philosophy is to discriminate in the factual situation three unknown factors and to

set forth in their quest. The first is the object, the given; the second is the subject, the knower; and the third is the relation, the cause or the giver. At the end of the quest the three unknowns have given place to three unknowables, matter, mind and God. Contrary is the way of monadology. It does not begin by dividing, it takes the individual in its integrity. It does not separate the perceiver from his perceptions, the agent from his actions, the mind from the body, the individual from the environment. It takes as its unit the subject of experience in its activity and studies it in its self-expression and development. Its task is to understand how the many are one, how the universe is composed of solipsistic individuals. Its task may be impossible, its ideal unattainable, it is steadfast to the principle that reality is integral, concrete and individual.

The principle of monadology is illustrated perfectly in the works of two philosophers of the modern period, Leibniz and Hegel. Why then is there need of a new monadology? The answer is not that their work is superseded but that it has received a new significance in the recent scientific revolution. The intellectualism of their outlook has made their systems appear artificial in the light of the new science. They lived before the evolution theory in biology and the electro-magnetic theory in physics had changed the scientific background. To Leibniz the difference between the bare monad at the limits of finite existence and the supreme monad perfect in the possession of infinite knowledge, power and goodness, was only a difference of degree. While the universe contained infinite view-points, there was only one mode of apprehension, and the creation of the monads required the foresight in the

creator which enabled him to pre-establish the harmony. The theory of creative evolution enables us, while retaining the same principle of individuality, to replace the artificial harmony with a harmony which is the natural outcome of the creative impulsion itself. The new principles which have replaced the conception of matter as a space occupancy with the idea of fields of force arising from the deformable nature of a space-time continuum, have introduced the monadic principle of active individuality into physics. The new monadology comes therefore not to destroy but to fulfil the old.

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